MOTOR AGE

Vol. XXIX
No. 6

CHICAGO, FEBRUARY 10, 1916

Ten cents a copy
Three dollars a year

Stung by biting blasts of frigid mountain gales—
Hung with the ice and snow of a mountain blizzard—
Bucking snow drifts and at the same time climbing, climbing.

This was the climax of the wonderful King Eight Test.

Eight Champion Heavy-Duty Spark Plugs were depended upon to stand up under this terrible continuous pounding—

To meet the extremes of ice without and fire within—
And to unfailingly deliver the spark of life to those eight throbbing, pulsating cylinders. And the dependable Champions never faltered—came through, all of them—delivering as they came—without a crack or break or short circuit, or miss of any kind.

Result—Champions are regular equipment on all King Cars produced in 1916.

Such are the gruelling tests which careful manufacturers give their cars and equipment.

Such are the tests which Champions—the Dependable Spark Plugs—have met and conquered time and again.

That's why the builders of American made motors equip four out of five of all that are built in this country with Champion Dependable Spark Plugs. They deliver—unfailingly.

Champion Spark Plug Co., 1106 Upton Avenue, Toledo, Ohio

A New Invention

Adds 80% to Motor Efficiency in the

$1375
at Detroit

Patented by Hudson
December 28, 1915
Patent No. 1165861

Hudson Super-Six

Engine Wear Almost Eliminated

THE invention of the Super-Six has a most profound effect.

It means 80 per cent of added efficiency without any added size.

It means vast reserve power—76 horsepower—in a motor which formerly yielded 42 horsepower.

It means that all other types—Sixes, Eights or Twelves — are conspicuously outmatched.

It means that this new type—patented by Hudson—dominates all Motordom.

34 HORSEPOWER SAVED

We have added no size, no cylinders. The Super-Six cylinders are 3½x5, same as the Hudson Six-40. And in all respects save one the motor follows standard practice.

What we have done is to save 34 horsepower which was heretofore lost in vibration. All that power, once wasted in friction, becomes reserve power in the Super-Six.

The result is a car which, in official performance, has broken the records for stock cars. And a car which in every way out-performs any other car you know.

It is, in addition, the smoothest-running car, the most flexible car in the world.

Doubled Endurance

But this vast reduction in vibration and friction means endurance more than all.

The Super-Six, in our speedway tests, ran 1350 miles at speed exceeding 70 miles per hour. A stock, 7-passenger touring car, remember.

No other stock car ever stood such a test. And none could stand it, probably. But no part or bearing, at the end of this test, showed any discoverable wear.

That means endurance far beyond anything before attained. The Super-Six motor should twice outlive any other type.

That is one economy. Another lies in such reserve power that the motor runs at half load usually.

IN HUDSONS ONLY

The Super-Six motor is found in Hudsons only. Men who want this superlative performance must buy the Hudson to get it. And every man will want it after a half-hour's ride.

He will find it combined with the most luxurious bodies we ever have placed on a car.

So, to fine car buyers, the Hudson this year is not only supreme but exclusive. Look into this car if you doubt it.

7-Passenger Phaeton, $1375 at Detroit.

Five Other Styles of Bodies

HUDSON MOTOR CAR COMPANY
Detroit, Michigan

World's Record Breaker

All Records up to 100 Miles

These tests were made at Sheepshead Bay with a 7-passenger Super-Six—a touring stock car—under official supervision of American Automobile Association.

100 miles in 80 min., 21.4 sec., averaging *74.67 miles per hour,* with driver and passenger.

75.69 miles in one hour with driver and passenger.

Two laps made at 76.75 miles per hour.

Standing start to 50 miles per hour in 16.2 sec. A new record in quick acceleration.

MOTOR AGE

Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

NEW YORK OFFICE, 239 West 39th Street

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, Under Act of March 3, 1879—Member of the Audit Bureau of Circulations. Circulation Audited and Verified December 8, 1914—Copyright by the Class Journal Co., 1916.

United States, Mexico and U. S. Possessions.....One year $3.00
Canada.....One year $5.00; All Other Countries in Postal Union.....One year 6.00

BEWARE OF SUBSCRIPTION SOLICITORS OFFERING PREMIUMS OR CUT RATES—ALL CURRENCY SHOULD BE SENT BY REGISTERED MAIL.

SUBSCRIPTIONS received up to the 15th of the month begin with first issue of that month; those received later, start with first issue of following month.

RENEWALS or CHANGE OF ADDRESS should be sent two weeks in advance of date they are to go into effect. Be sure to send old as well as new address to avoid unnecessary delay. RECEIPT of first copy is acknowledgment of subscription.

Volume XXIX February 10, 1916 No. 6

Contents

LINKING SAN DIEGO TO WASHINGTON WITH ROAD BONDS..... 5
Southern National Highway becoming a reality

EDITORIAL PERSPECTIVES..... 12
Motoring and drinking—Open car bodies can be improved

COLORADO AIMS TO PROSECUTE CAMPAIGN AGAINST FAKE DEALERS 13
Motorists, posing as agents, obtain tags at flat rate

BLAMES OIL COMPANIES FOR GAS PRICE INCREASE..... 14
Secretary Lane of Department of Interior reports

EXTEND YELLOWSTONE TRAIL—FROM PINE TO PALM..... 15
Three conventions of highway enthusiasts—Route of Jefferson road decided—To push Pikes Peak road

GREAT NORTHWEST, RICHEST MARKET FOR MOTOR CARS..... 16
Minneapolis show mecca of dealers and buyers—Show circuit flourishing

VANDERBILT AND GRAND PRIZE CUPS NOT FOR SPEEDWAYS.... 20
Corona to run grand prize of its own—Arrangements for amateur drivers' meet at Chicago

ALL-YEAR-ROUND CAR AS CARTOONIST AND RHYMSTER SEE IT.. 21

LINCOLN MILESTONES IN MEMORY'S HIGHWAY..... 22
Scenes reminiscent of the Great Emancipator

UNIFORMLY HIGHER PRICES FOR 1917 CARS..... 24
Increased cost of raw materials sure to make vehicles dearer

THE WHY AND HOW OF MOTOR CAR SPRINGS..... 26
Advantages and disadvantages of various types of suspension

STRENUOUS TESTS FOR FABRIC UPHOLSTERY AND TOP MATERIALS 30
How Fabrikoid is made in the Du Pont factory

VESTA CENTRIFUGAL ELECTRIC CLUTCH SMOOTHS CAR ACTION 32
Account of demonstration drive in vehicle equipped with new system

FREE PARKING SERVICE FOR CHICAGO'S ELECTRIC SHOPPERS.. 33

DEPARTMENTS

See America First..... 13
Readers' Clearing House..... 36
Accessory Corner..... 40
From the Four Winds..... 42
Among the Makers and Dealers 44
Motor Car Repair Shop..... 46

NEXT WEEK

"Touring in the Wake of George Washington" will be the feature of the issue of February 17, and a most opportune article since America celebrates the anniversary of Washington's birth on Tuesday of the following week. The article will describe Washington's tour from New York to Portsmouth, made in 1789 while he was president, and will be illustrated with pictures of places that the "Father of Our Country" visited and which can be visited by motorists of the present day in a trip across Massachusetts and Connecticut.

Million Dollar Ideas

No doubt the greatest opportunity for American scientific and inventive genius lies today in the motor car field. With over 2,500,000 motor cars in operation, 1916 production alone to exceed 1,000,000 cars, and no end in sight, consider the tremendous sales possibilities awaiting every new motor car product which meets a distinctly felt want in the industry hitherto never met.

Imagine the reception the motoring public will accord a 5-cent-a-gallon substitute for gasoline. Their attitude, though in lesser measure, should be exactly as enthusiastic towards any new equipment which markedly increases the enjoyment or decreases the expense of motoring.

The last word on motor car or motor car accessory improvement has not been said.

Your idea may not be a big one, but if it is a good one there is a market for it. What and where that market is will be determined for you gratis by writing —

MOTOR AGE
910 S. Michigan Ave., Chicago

Why I am a Studebaker Dealer—

I became a Studebaker distributor in 1912. I wanted a line of cars with a big future and I have it, a line backed by an organization second to none.

I often wonder why dealers endeavor to put over an unknown product that hasn't proved itself mechanically when they can handle a product that can save them time and effort explaining "Who it's made by" and of dodging the factory's financial responsibility.

Any dealer possessing keen business judgment coupled with a boundless enthusiasm and a capacity for hard work, which is necessary in this day and age, can make a success of Studebaker cars. This is the Golden age, the age of the Golden Chassis, that's why I'm a Studebaker dealer.

Arthur W. Haile

A. W. Haile Motor Co.,
Buffalo, N. Y.

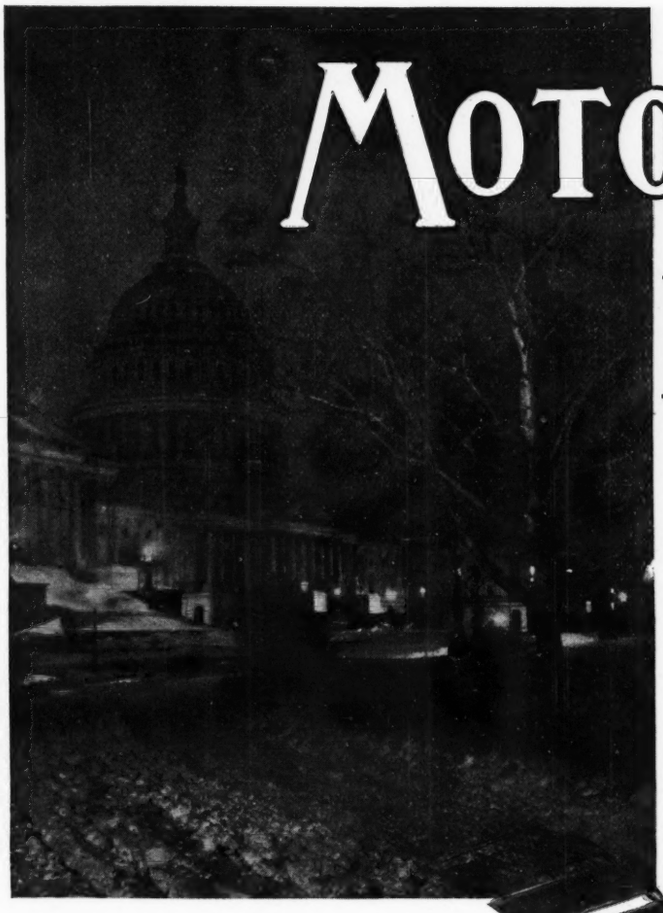
The steadily increasing success of Studebaker Dealers everywhere can be largely attributed to the close relations and the intimacy that exist between the Dealer and the GREAT organization centering in Detroit.

It is appreciation of this close co-operation as well as appreciation of the dominant VALUES of the cars that induces so many men in other lines of business to drop them to become Studebaker Dealers. Why not write and see what this Studebaker opportunity means to you?

STUDEBAKER Detroit, Mich. South Bend, Ind. Walkerville, Ont.
Address all correspondence to Detroit

Vol. XXIX, No. 6 Chicago, February 10, 1916 $3.00 Per Year

MOTOR AGE



Linking San Diego to Washington with Road Bonds

Southern National Highway Becoming a Reality Through Funds Voted and Construction Work Being Done on Motor Trail That Once Was a Target for Ridicule

By Al G. Waddell

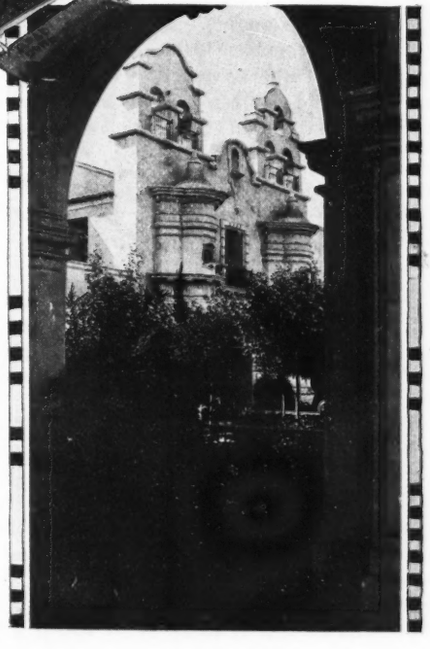
BUILDING national highways on paper has been a favorite indoor sport in America for several years, but today the movement is getting off paper and on to the ground, and everywhere in the land is heard the warning rustle of the bond issue. Highway improvement bonds in prosperous and progressive cities and rich and fertile farming sections vote themselves, as everyone knows, and the day of the poor road or street in those parts is past.

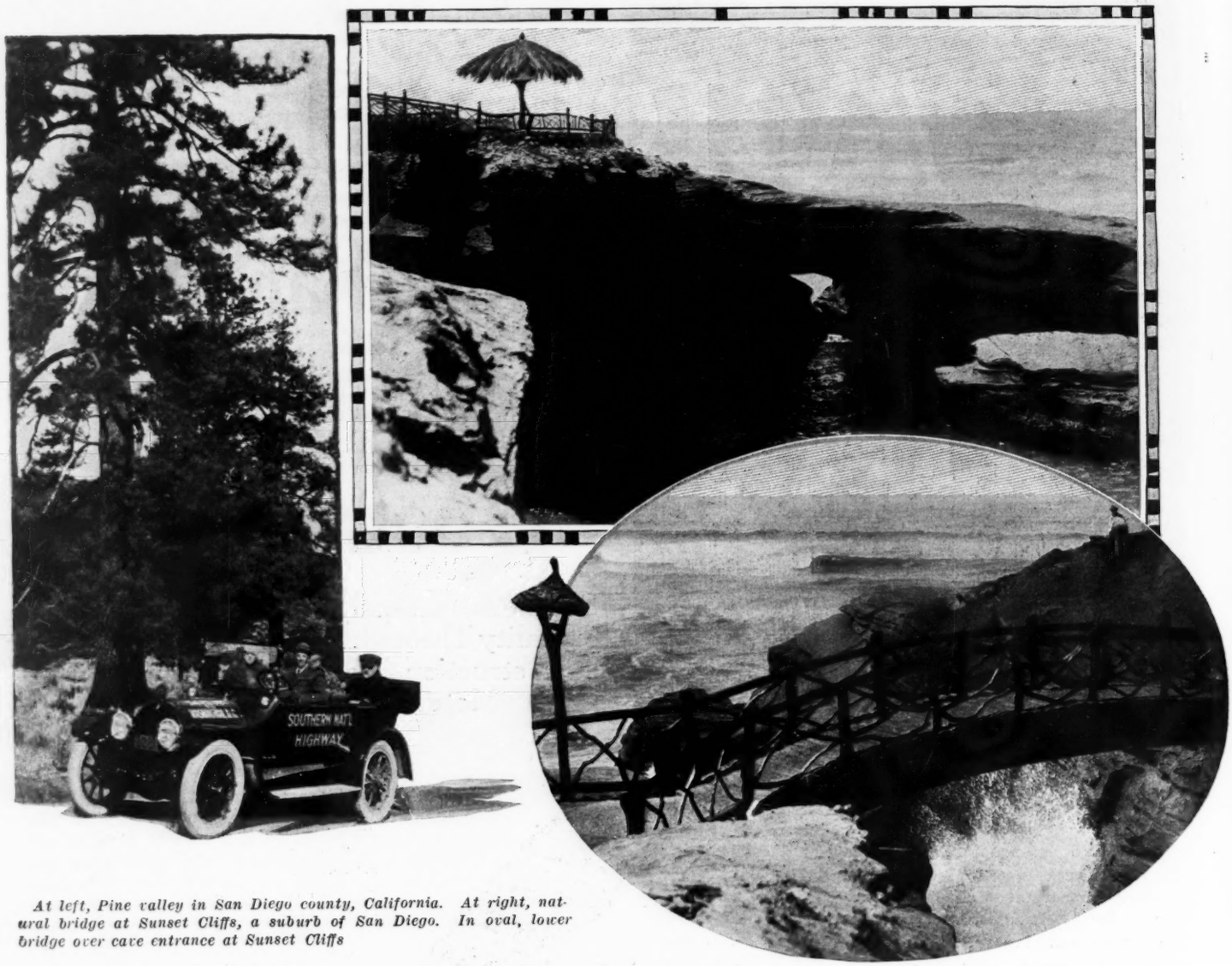
There was a national highway projected a few years ago that seemed to have hard sledding ahead of it. The discovery of a party of Californians recently that the people along the line of the Southern National highway, from San Diego, Cal., to Washington, D. C., are in a fair way to building their highway themselves, that they are grading and draining and surfacing and voting bonds and holding meetings and subsidizing newspapers and instructing their public officials and generally upsetting all preconceived notions about the amount of gumption, spunk and pep they possessed, has caused a re-awakening enthusiasm and hope in the hearts of good-roads enthusiasts everywhere. The least promising national highway is being built, in spite of what the wiseacres had forecast, instead of lying quietly on the blue-print until it was burned up and forgotten. The Southern National highway is almost a reality today!

It was an unpromising project when it was routed. It ran across states, at least from Virginia and North Carolina westward, that were generally supposed to be too far behind other communities in the good roads movement ever to catch up. That may have been a foolishly popular misconception, but it was a widespread opinion, for all that. What could Tennessee and Arkansas do with their cane brakes and bottom lands, their wild mountain sections, and their poverty-stricken counties? And Texas—why, one might as soon have thought of building a good road across the breadth of China as across the plains of Texas. And New Mexico and Arizona—bleak stretches of desert sand, no water, no money, no people, no interest in anything but politics and fighting Indians. And in Southern California was a chain of sand-hills well-known to be impassable—so there was an end of that project!

The Faith That Builds Roads

The trouble with the critics was that they did not know what they were talking about. They figured without the one quality most prominent in these Southerners and Southwesterners—faith. The states across which this route was projected are among the best in the union, and as fully alive to the need of a good road as any. But even if physical conditions had been much worse than they were, there is a spirit behind public enterprises along this route that laughs derisively at difficulties and does the impossible in many ways as "part of the day's work." That is why, today, the Southern National highway project is becoming a





At left, Pine valley in San Diego county, California. At right, natural bridge at Sunset Cliffs, a suburb of San Diego. In oval, lower bridge over cave entrance at Sunset Cliffs

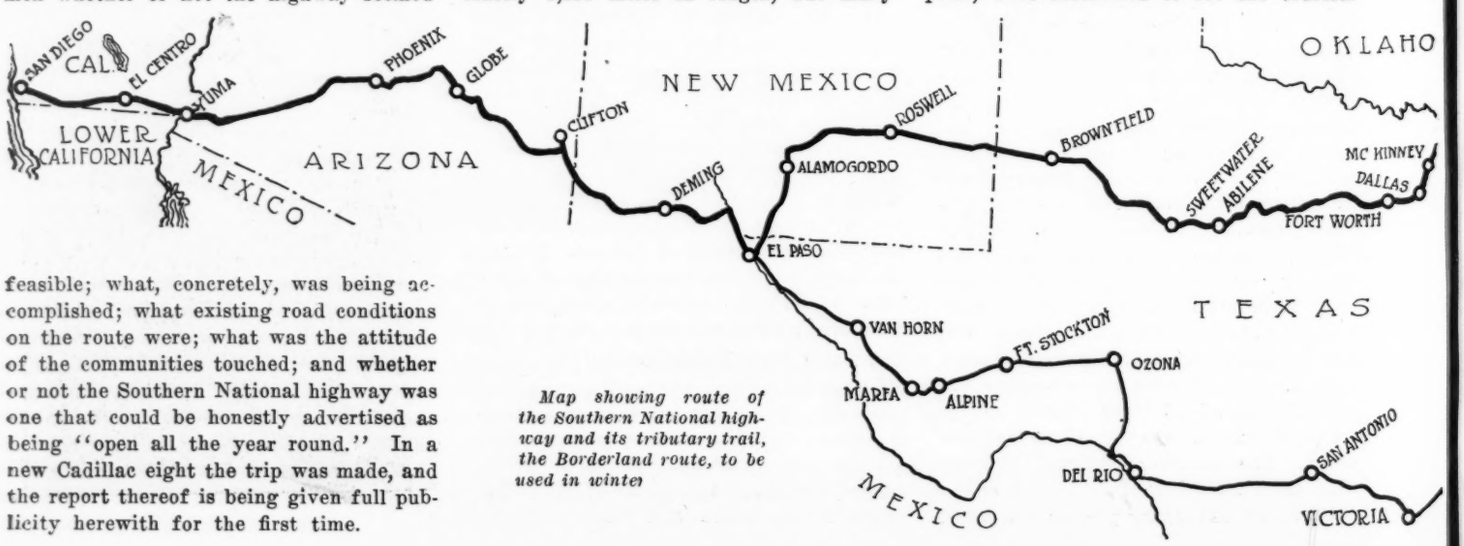
reality instead of remaining a dream—and what has been done and is being done forms a great object lesson to communities and good roads groups whose obstacles are much less tangible.

The Californians, who made the inspection tour, went from San Diego to Washington to find out for San Diego business men whether or not the highway seemed feasible; what, concretely, was being accomplished; what existing road conditions on the route were; what was the attitude of the communities touched; and whether or not the Southern National highway was one that could be honestly advertised as being "open all the year round." In a new Cadillac eight the trip was made, and the report thereof is being given full publicity herewith for the first time.

The Southern National highway runs from San Diego, through Arizona, New Mexico, Texas, Arkansas, Tennessee, North Carolina and Virginia, to Washington, D. C., with a southern division projected in a great swing southward along the Gulf of Mexico.

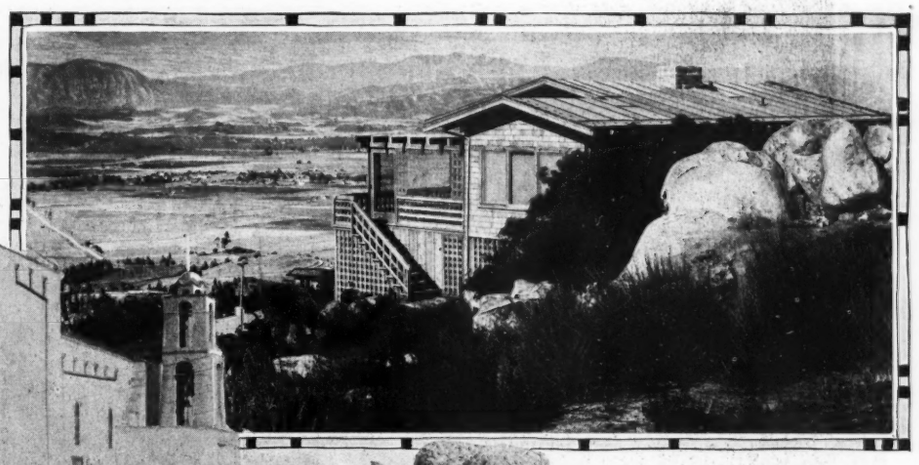
As mapped, the road will be approximately 3,250 miles in length, but many short detours, lost road, side-trips, and jogs made to avoid mud combined to give the distance logged above something over 3,500 miles.

The start was made at seven o'clock from San Diego, where a big gathering of business men, members of the Cabrillo Commercial Club that backed the enterprise, were assembled to see the tourists



Map showing route of the Southern National highway and its tributary trail, the Borderland route, to be used in winter

At right, summer house of Carrie Jacobs Bond, the composer, at Grossmont, near San Diego. Below, typical street and market scene at Juarez, across the river from El Paso on the Southern National highway

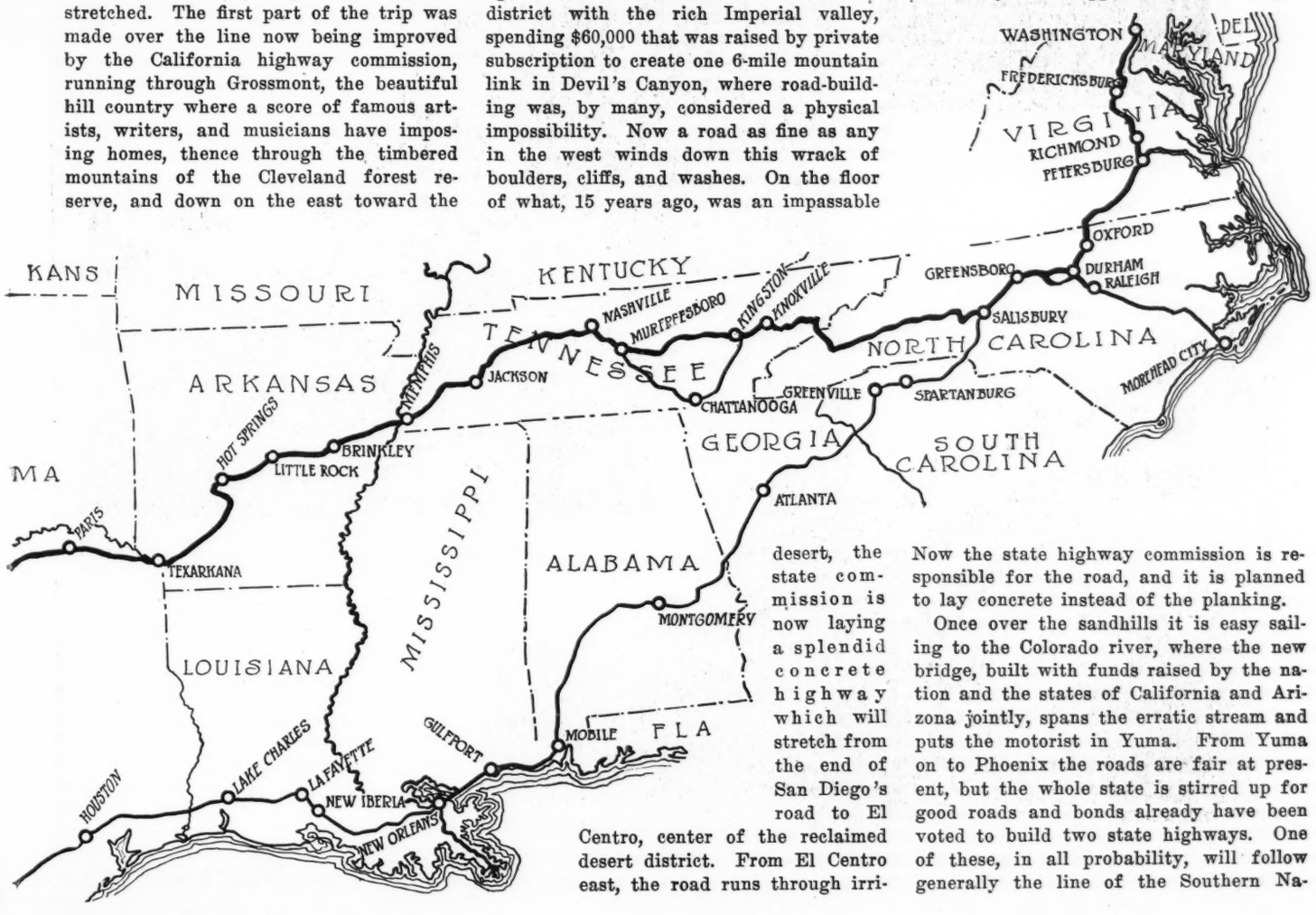


depart. The exposition, with its wonderful buildings of white and cream, with their wide red-tile roofs, was the last of San Diego seen, but beyond that and the land where the city lies, the blue Pacific stretched. The first part of the trip was made over the line now being improved by the California highway commission, running through Grossmont, the beautiful hill country where a score of famous artists, writers, and musicians have imposing homes, thence through the timbered mountains of the Cleveland forest reserve, and down on the east toward the desert, once a region of terror for the transcontinental motorist.

San Diego citizens built 18 miles of road down Devil's Canyon a few months ago to connect their harbor and business district with the rich Imperial valley, spending $60,000 that was raised by private subscription to create one 6-mile mountain link in Devil's Canyon, where road-building was, by many, considered a physical impossibility. Now a road as fine as any in the west winds down this wrack of boulders, cliffs, and washes. On the floor of what, 15 years ago, was an impassable desert, the state commission is now laying a splendid concrete highway which will stretch from the end of San Diego's road to El Centro, center of the reclaimed desert district. From El Centro east, the road runs through irrigated farms to Holtville and thence east several miles to where the desert is encountered.

The sand hill chain between the Imperial valley and the Colorado river has been unanimously damned as a final barrier to man's travel in the past, but ingenuity has beaten even the sand hills. Two wooden tracks have been laid on their surface, one for each motor car wheel, and over these now the motorist glides smoothly. The planks were placed by Holtville people with faith, but most of the money was supplied by San Diego. Now the state highway commission is responsible for the road, and it is planned to lay concrete instead of the planking.

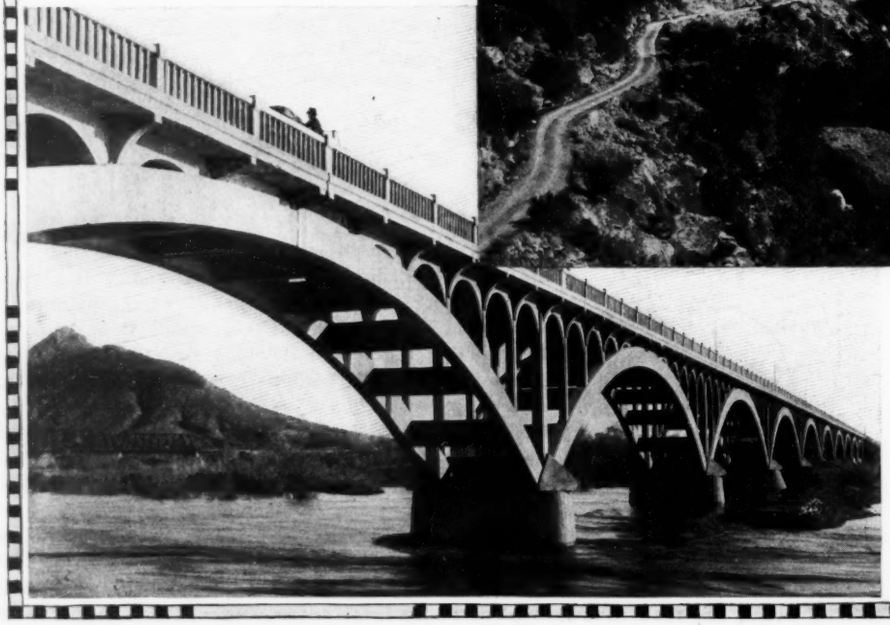
Once over the sandhills it is easy sailing to the Colorado river, where the new bridge, built with funds raised by the nation and the states of California and Arizona jointly, spans the erratic stream and puts the motorist in Yuma. From Yuma on to Phoenix the roads are fair at present, but the whole state is stirred up for good roads and bonds already have been voted to build two state highways. One of these, in all probability, will follow generally the line of the Southern Na-



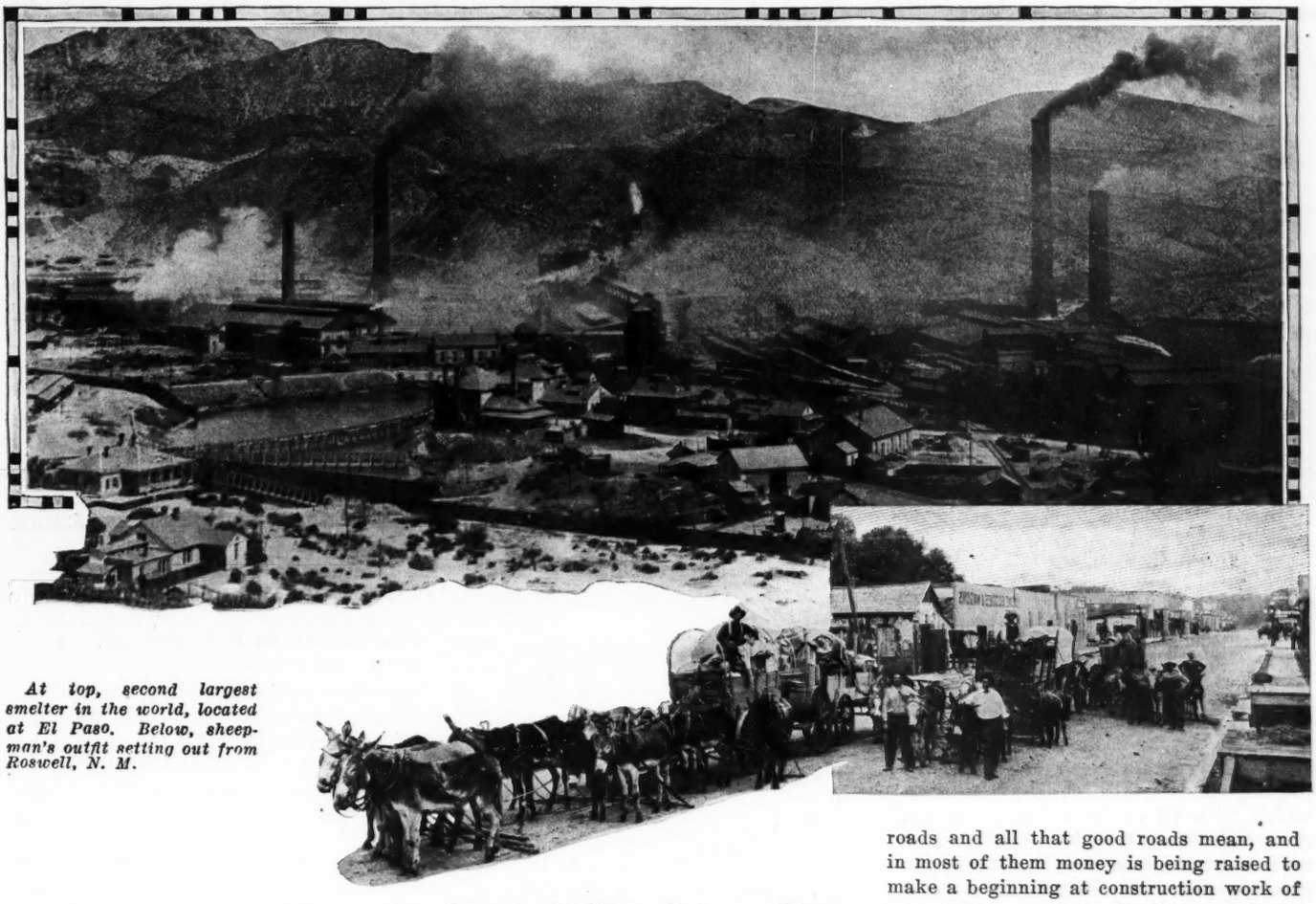
How water is stored in the spillways of the Roosevelt dam, on route of Southern National highway between Phoenix and Globe, Ariz.

Stopping place at the bottom of Fish Creek, near the lunch station between Globe and Mesa

Among the giant cacti near Maricoabo, Ariz.



At right, Fish Creek hill, encountered by the Southern National highway tourist between Phoenix and Roosevelt dam. At left, bridge over the Salt river at Tempe, Ariz., built by convict labor



At top, second largest smelter in the world, located at El Paso. Below, sheepman's outfit setting out from Roswell, N. M.

tional highway—in any event it will make the east-to-west passage of Arizona simple. Work is being started on these roads at this writing.

Thus two states are already in line—California with its share partly built and Arizona with money available.

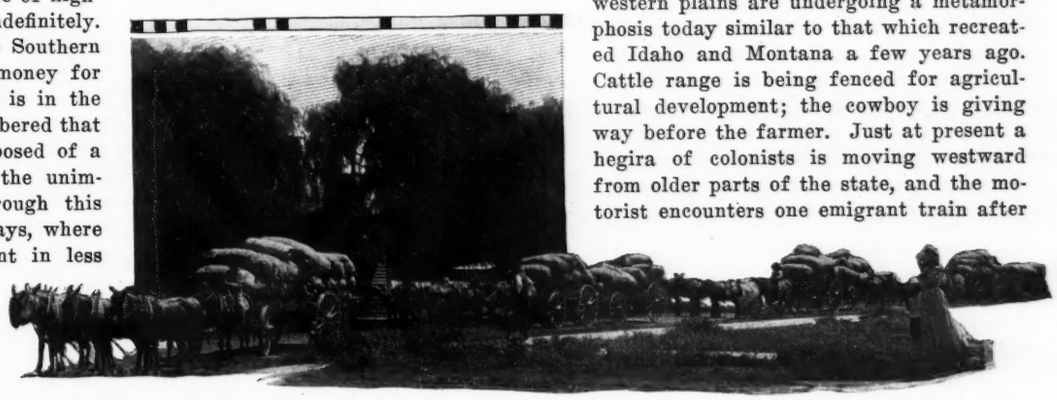
Conditions in New Mexico

The mapped highway runs southwesterly from Deming, New Mexico, to El Paso, Tex., and from El Paso swings north again to traverse the eastern end of New Mexico, passing out of that state east of Roswell. New Mexico is a new state, with a population comparatively small, and wide areas that are either barren or devoted exclusively to cattle and sheep raising. Its distances are tremendous and developed water is scarce. All of these factors will delay good road work. But New Mexico is alive to the importance of highways and will not be held back indefinitely. Some of the counties along the Southern National route have provided money for surveys, and a state bond issue is in the air. Meantime it must be remembered that these so-called deserts are composed of a natural road material, making the unimproved and ungraded road through this section as good as many highways, where young fortunes have been spent in less fortunate localities. It is a well-known fact that the experienced motorist takes to desert driving with relief after a few hundred miles of average country road. So following the route of this particular highway through New Mexico presents no obstacles to affright the most timid driver.

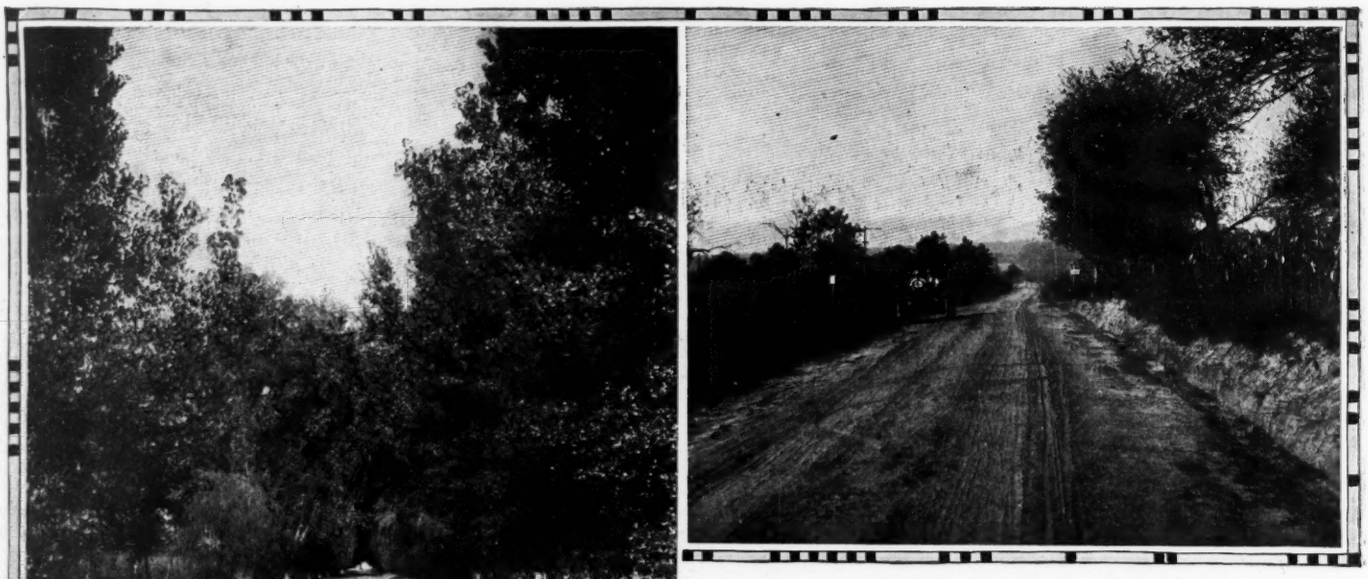
In Texas distances are so enormous as to stagger the mind. Through the plains the route touches a score or more of small towns, several sizeable ones—Abilene, Paris, Bonham, and so on, and two big cities, Fort Worth and Dallas, but these are mere incidents, insufficient to break the tedium of the long reaches of road. One realizes how difficult it will be for the state to improve a highway across its own great width, but the individual counties are not so backward. In almost none of them is there total indifference to good roads and all that good roads mean, and in most of them money is being raised to make a beginning at construction work of one sort or another. Grading and draining become more necessary as you get eastward, because you get into the region of substantial winter rains, and this work is going on. Many counties, or their central communities, are employing the drag. Surfacing is coming in some of the older and more prosperous counties. In spirit the Texans are good roads enthusiasts and what they lack in funds they are making up in good intentions, in temporary work, and in a very promising sort of financing of their highway improvement activities that may, within a few years, give Texas a series of excellent county roads joining to make what in effect will be a cross-state road.

The Metamorphosis of Texas

The state is one of the most interesting traversed by the tourist on this route. The western plains are undergoing a metamorphosis today similar to that which recreated Idaho and Montana a few years ago. Cattle range is being fenced for agricultural development; the cowboy is giving way before the farmer. Just at present a hegira of colonists is moving westward from older parts of the state, and the motorist encounters one emigrant train after



Bringing wool into Roswell over the Southern National highway



At left, picturesque stretch of Southern National highway near Roswell, N. M. At right, top soil road near Hickory, N. C.

another, in old-fashioned canvas-covered wagons, drawn by the family's best stock, loaded with all its household goods and gods, and followed by its cows, its dogs, its sheep, and its odds and ends of farming equipment. The whole family is along, and on the hard pulls the head of the house and the children get out and walk while mother drives. One emigrant passed by the California party had a new wrinkle on the old pioneer, however. He had equipped a small motor car with oversized rear tires to give him greater traction, and had hitched his machine to the emigrant wagon. It was a picture that would have stopped attacking Indian braves 40 or 50 years ago, you may be sure of that.

Arkansas Roads Happy Surprise

The state line is crossed at Texarkana, two cities in one, for Texarkana straddles the line and has political entity in Texas and in Arkansas. From here eastward to the Mississippi river the traveler may prepare himself for many surprises if he has the idea that Arkansas is a state that is only a joke. It is far ahead of many states that laugh at it, and its roads, while not highly improved as yet, are in very fair condition. The eastern end of Arkansas, and those sections which lie along the rivers, is low and flat and flood water inundates many square miles at certain periods. But Arkansas is turning its attention to flood control and to drainage and is making permanent dry land where a few years ago was swamp. All this improvement points to better roads, and the leaders of the people are beginning to influence them toward a state-wide good roads movement. Many of the counties are doing work, and good work, on their own roads, some of them have voted bonds, and more of them are planning to do so at the earliest practical moment. So that Arkansas will not be far behind in the procession.

Much the same observations hold in Tennessee, where there is more accumulation of wealth in the larger cities, and where manufacturing and development have gone further, so that good roads movements may properly be expected to be in healthier condition. Tennessee has more rivers, probably, mile for mile, than any state in the union, and bridges are expensive. And yet one is surprised to find the number of fine, permanent structures spanning these streams that are already in place. Tennessee's good roads movements lag in spots, but in dry weather the motorist can get through today without great difficulty or annoyance, and he is rewarded with some of the most wonderful scenery and most interesting and historic country of the whole run.

Going into North Carolina near Marshall, it is only a short run to the beautiful and historic city of Asheville, which is familiar to tourists now. The route of the Southern National highway carries the motorist through Morganton, Salisbury, Greensboro, Durham and Oxford, and Virginia is entered on the main Washington-to-Atlanta road. From that point through Petersburg, Richmond and romantic old Fredericksburg to Washington, the highway is one teeming with beauty and historic interest. It is being improved constantly, and although there are disgracefully bad spots along the way, it seems only a matter of a few months until there will be a highway through Virginia really worthy of the name and of the state.

Road Markers Are Needed

The travelers who have just made this trip are eloquent on the subject of road signs. In fact, their eloquence will scarcely stand repeating. With few exceptions they found no road signs of any value after leaving Texas, and for miles the only ones they saw were so misleading as to be worse than none. The people on the road are obliging and friendly, but they are ignorant of the difficulties of piloting a motor car through a strange land and their directions are pretty nearly impossible to follow when one has them. In

LOG OF INSPECTION PARTY ON SOUTHERN NATIONAL ROAD

Nov.	Run	Miles		Road conditions
2	San Diego to Yuma, Ariz.	203		Excellent
3	Yuma to Phoenix	188		Good
4	Phoenix to Globe	115		Excellent
5	Globe to Clifton	165		Poor
6	Clifton to Deming, N. M.	132		Fair
7	Deming to El Paso, Tex.	135		Fair
8	El Paso to Ruidoso, N. M.	152		Good
9	Ruidoso to Roswell, N. M.	80		Fair
10	Roswell to Snyder, Tex.	250		Good
11	Snyder to Mineral Wells	210		Good
12	Mineral Wells to McKinney	125		Good
13	McKinney to Clarksvills	135	(Rain)	Fair
14	Clarksville to Texarkana	65	(Rain)	Fair
15	Texarkana to Arkadelphia (rail)	81	(Rain)	Car shipped
15	Arkadelphia to Little Rock	90	(Mud)	Fair
16	Little Rock to Forrest City	115	(Mud)	Fair
17	Forrest City to Memphis	*55	(Mud)	Poor
18	Memphis to Jackson, Tenn.	102	(Rain)	Poor
19	Jackson to Johnsonville	87	(Rain)	Very poor
20	Johnsonville to Nashville	105	(Mud)	Fair
21	Nashville to Sparta	102		Fair
22	Sparta to Knoxville	120		Fair
23	Knoxville to Marshall, N. C.	108	(Mud)	Wretched†
24	Marshall to Hickory	120		Good
25	Hickory to Durham	186		Very good
26	Durham to Fredericksburg, Va.	230		Very good
27	Fredericksburg to Washington	‡110		Excellent

*Traveled only two hours. †This was a detour, necessitated by road work. ‡Arrived at 12:30 noon.

Tennessee they say: "Follow the straight man's road," which is picturesque and might be enlightening, if it were not for the fact that "straight" in Tennessee seems to mean about as crooked and winding as you can make it. Also the familiar direction "Take the main traveled road," is confusing, especially after a little rain has fallen.

Because the heaviest sort of travel in Tennessee isn't very heavy, outside the big cities and towns, and a cotton cart passing along a road and taking a certain turn will mark that road deeply enough to make one think it is the only "main traveled road" in the county. Yet, likely as not, one comes presently on the cotton cart, stopped before an out-of-the-way gin or river landing, and he finds that he has to go back a few miles and take another fork.

Signs are very easy to make and fairly easy to erect, and it seems a pity that the counties or states don't interest themselves. The Southern National highway association has taken this matter in hand now and a great reform is promised shortly.

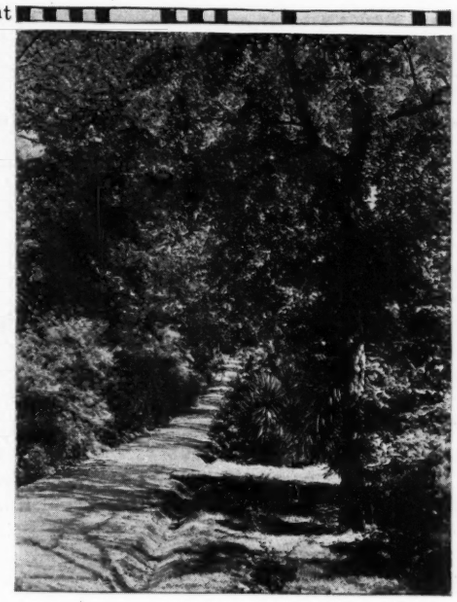
Almost without exception the hotel accommodations on this route are excellent, and one's itinerary can be so laid out so that a comfortable stop can be made every night. Usually lunch is quite as simply figured, although there are places one would cheerfully miss.

Ferrying a Nuisance

Ferrying is a nuisance and a disgrace, and the time is soon coming when ferries will be cut out by the construction of bridges. At present there are several ferried rivers on the route and one has to make the best of them. But when you see one ahead, it is wise to make provisions for service by telephone, whenever possible, as the traveler can waste considerable time and a certain amount of energy waiting on a river bank if he is not forehanded.

The toll roads of North Carolina and Virginia are an innovation to most people and very few can face a toll-gate keeper with a smile. How so many counties in these two states ever became encumbered with toll roads is a mystery, but they have 'em, and they don't seem yet to know enough to get rid of them. The roads are bad, almost as a rule, the tolls excessive, service considered, and the whole idea un-American and nonsensical. The Southern National highway association is working on these nuisances now and hopes before many years to have every toll gate on its entire line pitched into limbo for all time.

The party making the recent inspection trip comprised B. H. Burrell, an engineer in the federal bureau of roads; W. B. Gross, a San Diego business man; B. H. Taylor, driver; Wilbur Hall, an observer, and, in succession, Col. Edward Fletcher, of San Diego, Cal.; Del M. Potter, of Clifton, Ariz., and Col. Bennehan Cameron, of Raleigh, N. C. Cols. Fletcher and Cameron are vice-presidents and Col. Potter is president of the Southern National highway association.



Arborum of the University of North Carolina at Chapel Hill on the route of the Southern National highway

PLAN ST. LOUIS-CHICAGO TOLL ROAD

Bloomington, Ill., Feb. 4—At a meeting of good roads boosters of central Illinois, the Corn Belt highway was formally launched. It was proposed to improve the shortest road between Chicago and St. Louis. While it is expected that in the course of time there will be a concrete toll road between the two metropolitan cities, it was felt by the promoters that this project was too remote to be considered, making immediate action expedient. The Corn Belt highway will follow the Chicago and Alton railroad and will give motorists a road approximately 290 miles in length. The Corn Belt will interlock with the Burlington highway from St. Louis to Springfield but will have its individual marking.

MOTOR HIGHWAYS FOR MEXICO

Tampico, Mex., Feb. 2—What is said to be the first highway for the exclusive use of motor cars ever built in Mexico was recently finished between this city and Panuco, a distance of about 35 miles. The purpose of the new road is to afford a transportation connection between the two towns for motor trucks and cars in oil operations that are being conducted on an extensive scale at Panuco.

Heretofore, all transportation between Panuco and Tampico has been by boat upon the Panuco river. The oil companies maintained expensive gasoline launches for the accommodation of their officials and other employes. This cost will now be done away with, it is stated, and a regular service of motor cars will be established between the two terminals via the new highway.

The country districts around Tampico are sadly lacking in good roads, but it is expected that this condition will be remedied rapidly. Many of the larger oil companies already are spending considerable money in the construction of roads for their private use and later on many of these highways will probably be connected up and made into a general system and thrown open to the public.

Plans are also on foot for the construction of a modern highway between Tampico and Monterey, more than 325 miles, and another one between this city and Matamoros, on the Rio Grande border, about 315 miles. The states of Tamaulipas and Nuevo Leon will lend financial aid to these projects and the federal government of Mexico is expected to give similar assistance.

SPECIAL TRAINS FOR ROAD BUILDERS'

New York, Feb. 4—Invitations have been sent to the governors of the several states of the Union and to the lieutenant-governors of the provinces of Canada to attend the thirteenth annual convention of the American Road Builders' Association, to be held in Pittsburgh, Pa., during the week beginning February 28.

Mayor Armstrong, of Pittsburgh, has invited the mayors of some 3,000 other cities to attend. Invitations are also being sent out to the road officials of the different states, and the correspondence of the officials of the association indicates that the attendance will be very large.

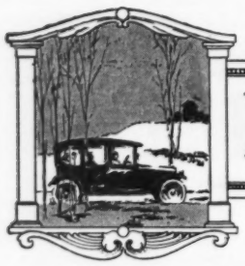
Announcement has been made that the Trunk Line Association has granted a rate of 2 cents per mile from points in its territory to Pittsburgh and return.

MAINE DEALERS STRIKE SNAG

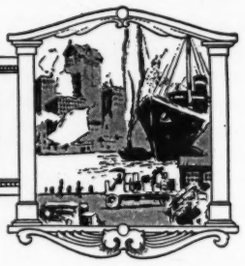
Augusta, Me., Feb. 5—Secretary of State John E. Bunker, of Maine, has sent out a letter to all the motor car dealers of that state calling their attention to section 9 of the motor vehicle law, to the effect that the fee of $25 they pay as dealers covers the purpose of demonstrating cars for sale and exchange, and that under the interpretation of the law by the last two attorney generals of Maine, a dealer has no authority to use a dealers' registration plates on cars while carrying passengers for hire, taking pleasure rides, or in fact while engaged in any other occupation than that of demonstrating cars for sale. This, in effect, ties up the use of cars by dealers to take their families out Sundays, holiday or at other times unless they have one of their cars registered as that of a private owner. The dealers feel it is an injustice, and they will try to have the law repealed or modified.

JORDAN ESTABLISHES DETROIT OFFICE

Kenosha, Wis., Feb. 8—E. S. Jordon, president of the new Jordon Motor Car Co., announced today that an engineering office has been established in the Goldberg building, Detroit, where preliminary design work of the new car is being carried out. The company has not decided on a factory location as yet.



EDITORIAL PERSPECTIVES



Motoring and Drinking

THE CAMPAIGN is growing wider and wider regarding heavier fines for drivers arrested when under the influence of liquor. The highway commission of Massachusetts is contemplating asking the legislature to pass a law empowering the commission to suspend the license of a driver for several months or even a year at the time of the first offense. The present period of suspension is 60 days. It is claimed that liquor figures in more than 50 per cent of the accidents in the Bay State, and if this is the case then any law that will stamp out this condition is desirable. Taking away the privilege of a person to drive a car is a good punishment for lawlessness. If a person wilfully abuses the highways then it is but natural that he should be deprived of their use for a reasonable length of time.

IN SEVERAL cities the movement to have motorists cautioned is gaining and it certainly will have a good effect. Motorists should work to have it started in all cities. We pride ourselves on saying that "an ounce of pluck is worth more than a pound of luck;" why not work on the thought that "an ounce of warning is better than a pound of fines." The warning gets closer to the motorists than the fine. It gives them a thousand times more respect for authority than if they are arrested for going 16 miles per hour when the legal limit is 15. Let us get a little more sanity into motoring and also into the police departments of many of our cities. Get a little more sanity into pedestrians. Get them into the habit of crossing streets only at the proper places.

Open Car Bodies Could Be Improved

OPEN touring car bodies are perceptibly improved over a year ago, but are yet distant from the ultimate. Many of the 1916 styles are more attractive externally but when you look at the floor, at the back of the front seats and under the cowl, there is room for improvement. A motor car is the house you travel in when on the highways. We make our homes attractive inside as well as outside. We have coats of paint applied periodically to the external; on the inside we make the floors attractive, decorate the walls, tint the ceiling, and make every part of the interior on which the eye falls attractive and pleasing.

THIS is not always done in the car. The tonneau floor is torn up in several cases with four or six slots in which lie the irons and hinges of the auxiliary tonneau seats. These slots are excellent mud receptacles, good dirt collectors and never can be made to look attractive. Many makers are now mounting these seats so that when folded, there is not a single indication of their presence. They are doing the work as it should be done.

TOO OFTEN the rear seat is too high. When seated in it, you feel up in the air compared with the front seat passengers. This is not essential. It is possible to have the rear seat comfortable, low as the front seat and upholstered so that it does not catch you in the small of the back but so shaped and upholstered that you feel you can ride in it all day without even the use of the foot rest.

EXTERNALLY there is not so much improvement as was expected. It is true that several makers have adopted the cowl back of the front seats, but it is out of place unless in conformity with the general lines of the car. There is not enough effort given over to getting the rear end of the car closer to the ground. One or two makers have worked on this with good results but the effort is not general enough.

THE stream-line talk is as general as ever, but in the final analysis there are not nearly so many stream-line designs as the makers would try to have you believe. If there is a sloping cowl, that seems sufficient to warrant the use of the word stream-line. Stream-line means a car with a very high radiator and front effect. The fish, with its true stream-line contour, is larger in front and tapers to the tail. Measured by this standard, there are few makers whose cars could even qualify in a single essential. It might be better to adopt some new body nomenclature, and instead of using such a term as stream-line, use the terms tumble-in or crush-sided, now used in some countries.

GREATLY increased car production has had its effect on holding back body perfection. This is apparent in a careful round of the exhibits, in which the best body lines are generally found on those cars manufactured in medium quantities, and by makers commanding above the average price. It will not be surprising in another year to witness very marked body improvements in cars built in large quantities. These makers have overcome many of the other difficulties of production and will unquestionably take up the body in due time.

THE body artist is needed. The man who designs the valve action in the motor, who has conceived the scheme of balancing the crankshaft, or who is responsible for the new clutch, has no reasons to appropriate to himself the design of the body. Here is where the inexcusable errors creep in. He takes the curved top or a radiator from some other make, where it is but one curve in the general scheme of curves in the body, and endeavors to fit it into an entirely different line of curves in his own body. Instead of improving the design, he has made it ridiculous. There are examples of this in the show.

THE car body should be looked upon as the suit of clothes that a man wears, the evening gown on the woman, or the dress overcoat on the gentleman. We would not expect the man who made your shoes to be capable of making your overcoat, yet you have no reason to even think that the shoes and overcoat will not match well simply because designed by different persons. The fashionable milliner rarely is a maker of fashionable gowns, yet who challenges the harmony between hat and gown on the well-dressed woman? More study should be given bodies. The time is near when correct body lines will be a greater sales factor than they are now. The day will come when body lines and comfort will be the turning points and perhaps stronger selling points than the number of cylinders, the type of spring, or the make of starter.

Colorado Aims to Prosecute Campaign Against Fake Dealers

Motorists, Posing as Agents, Obtain Tags at Flat Rate and Save License Fees Based on Horsepower

DENVER, Col., Feb. 7—The fake motor car dealer will strike even more rocks in his road in Colorado this year than he did last, according to Secretary of State John E. Ramer and his chief motor vehicle license inspector, Carl De Lochte. This brand of bunco artist gave the state authorities a great deal of trouble last year, and the intention is to increase the trouble in the opposite direction from now on.

"There is not much to say in regard to regular dealers," says Inspector De Lochte, "as most of the reliable dealers are working in harmony with Secretary Ramer and his inspectors, and will notify their customers of mistakes, if there are any. There are, however, about 15 per cent that have dealers' licenses that will do anything. Some of the latter class have never sold a car or had an agency, and have even bought the car they are driving themselves from a regular dealer. It is these dealers who have 60-horsepower cars and get by for half the money they ought to pay, but the inspectors will check up these gentlemen the coming year, and Mr. Fake-Dealer will be forced to pay his just share."

This attitude on part of the state authorities is strongly supported by the Automobile Trades Association of Colorado and by the Denver Motor Club.

The license fees in Colorado are $2.50, $5 and $10 for owners, the horsepower division being up to 20, from above 20 up to 40, and above 40. A dealer's license costs a flat rate of $5 per car for demonstrating purposes, regardless of horsepower.

FORD ACCESSORIES PAY TOUR COST

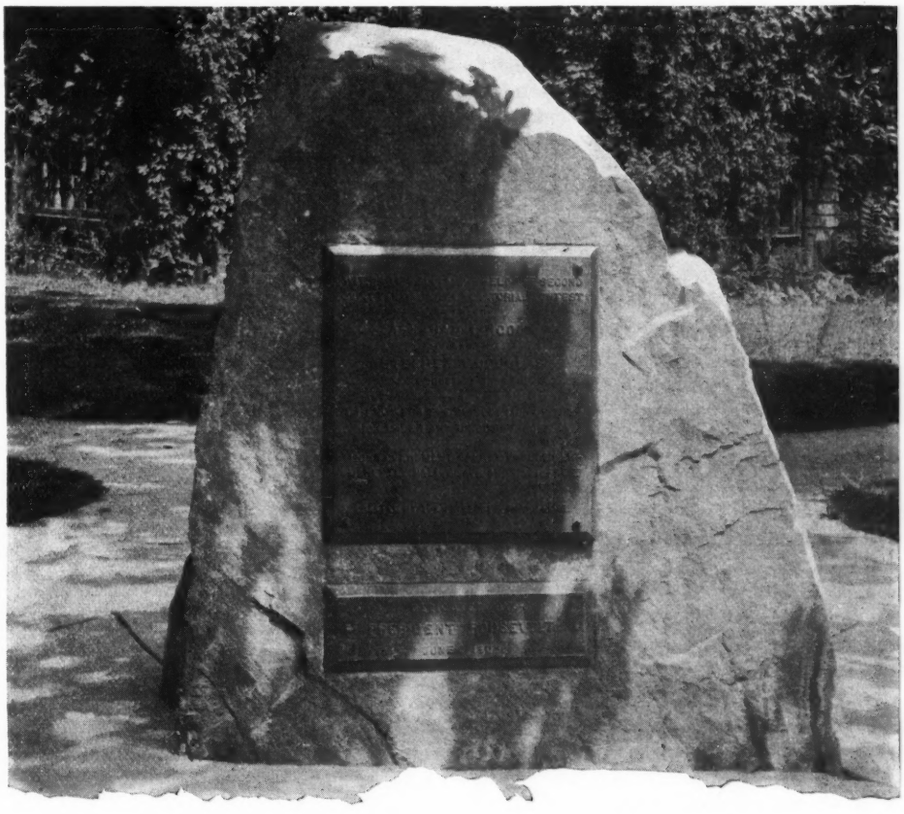
Nashville, Tenn., Feb. 5—Touring over the Dixie highway, R. L. Townsend and J. V. McClure, two young men of Lima, O., have a new method of selling and advertising Ford accessories. They are traveling with their own Ford, equipped with the various accessories they are selling, and the trip is providing them with good talking points for the garagemen and owners along the road. They left Detroit on the trip 2 months ago and will go to Miami, Fla. The good condition of their car after the rough roads they have passed over furnishes testimonials as to the various accessories. They are also advertising the Dixie highway on the trip.

WHISKY SMUGGLERS USE CARS

Montgomery, Ala., Feb. 6—Motorists who lend their machines for the purpose of bringing whisky into a dry state may find that it costs them their car, if the case against J. Howard Ellis, of Prattville, is upheld. Ellis rented a machine to two men who were arrested when the car was found laden with eighteen cases of whisky. The car was retained by the sheriff. When Ellis sought its return he was arrested on a charge of violating the prohibition law. In line with the state's policy of holding all containers of alcoholic fluid, the machine is confiscated.

Motor cars have figured in a large number of alleged prohibition violations recently, speed being an essential in this profession. One suspect was arrested in a car that was found to contain no booze. The machine was equipped with several extra tanks, and while the owner declared these were for reserve gasoline storage, there was an odor of whisky, which was part of the evidence that led to a heavy fine.

See America First — See America Now



EDITOR'S NOTE—This is the sixty-fifth of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country.

NO. 65—BOULDER COMMEMORATING SCENE OF LINCOLN-DOUGLAS DEBATE

IN the city of Freeport, Ill., at the corner of Douglas avenue and Mechanic street, is a boulder and bronze tablet marking the spot where Abraham Lincoln and Stephen A. Douglas met in their joint debate on the slavery question on August 27, 1858. It was here that the country lawyer, who was destined to be our Civil War president, declared: "This government cannot endure permanently half slave and half free," a statement of policy that cost him the senatorship but which elevated him to the presidency 3 years later. The Brewster House, where Douglas and Lincoln spent the night, is one of Freeport's landmarks. Both were assigned rooms on the third floor, Lincoln the one on the right and Douglas to one on the left of the balcony.

Blames Oil Companies

Secretary Lane Puts Onus on Refiners for Gas Price Increase

Says the Cost of Crude Oil Does Not Entirely Justify Boost

WASHINGTON, D. C., Feb. 5—In response to the resolution introduced by Senator McCumber, calling for information regarding the present high price of gasoline, a report from the interior department has been presented to the senate. While indicating that the domestic use of gasoline had increased very greatly and also the export of gasoline, the report suggests that the strong refining and transportation companies are in a position to make the consumer pay high prices for their product.

The report shows that the gasoline production has increased from 6,680,000 barrels in 1899 to 41,600,000 barrels in 1915. The last figures are an estimate. The report states that there was an estimated excess of gasoline in storage amounting to 2,000,000 barrels January 1, 1915, and that it has been reported that this was practically exhausted January 1, 1916.

That the exports of gasoline had increased is shown from the fact that exports for 1914 exceeded those for 1913 by 500,000 barrels and those for 1915 exceeded the 1914 exports by 1,500,000 barrels.

It is estimated that the increased consumption of gasoline in the United States in 1915 over 1914 was 25 per cent. The interior department suggests that a slight increase will obtain in 1916.

The strong companies refining and transporting crude oil and its product, gasoline, have a strong advantage, according to the report. These refineries are in a position, says the report, to sell at higher prices gasoline derived from crude oil purchased in a lower market.

The report indicates, however, that while the use of gasoline in the United States is increasing by leaps and bounds, largely due to motor vehicles, the production of the oil from which it is derived appears to have reached its maximum.

Another Raise in Keystone State

Gasoline has gone up 2 cents in Philadelphia, Pa., now selling in most places for 23 cents, although some garages are getting 26 cents, which is said to allow a very narrow margin of profit. All grades of gasoline in Pittsburgh are up 2 cents, some charging 27 cents, the highest ever prevailing in that city.

Protests are being made against the skyrocketing prices in several states, the latest to be heard coming from Missouri, where every car owner in the state is being urged by the independent oil dealers to use their influence with their congressmen toward defeating the proposed bill for taxing gasoline as a war measure.

Gasoline 26 Cents in Hub

Boston, Mass., Feb. 7—The big oil companies have announced another raise in the price of gasoline here this week, putting it up to 24 cents wholesale, which will make it 26 and 27 cents retail. This will be the eleventh time that the price has been raised since last winter, and as the fuel was selling at 13 cents a gallon wholesale a year ago the present increase is about 85 per cent. The motor organizations plan to take it up with their representatives at Washington.

MUCH WATER IN GASOLINE

Bloomington, Ill., Feb. 4—An unusually large amount of water in gasoline is resulting in the freezing of pipe lines in motor cars, adding greatly to repair bills of central Illinois owners. The present winter has been marked by many days with below zero temperature and, with the presence of an abnormal amount of water in the gasoline, has been followed by numerous cases of pipe line trouble. Garage proprietors say that this trouble was never so pronounced as at the present time and they attribute it to the adulteration in oils, believed to be carried on to a greater extent this season than ever before.

GASOLINE FROM COAL OIL

St. Louis, Mo., Feb. 4—A process of extracting gasoline from coal oil, which it is claimed, will materially reduce the retail price of gasoline, was demonstrated today by officials of the Bell Oil Co., independent dealers of this city, at the company's laboratory. The process consists of mixing a substance, the nature of which is being kept secret, with coal oil and then distilling the mixture. The process was devised by Ralph M. Appel, secretary of the Bell Oil Co. and application has been made for a patent.

The officials of the company claim gasoline thus derived is entirely free from the oil or grease found in coal oil, is lighter and much more volatile. The kerosene-made gasoline has been tested on a Moon car and was found as efficient as the gasoline now on the market, the inventor claims.

The oil company plans to carry the experiment out on a larger scale and for this purpose has purchased two 2,500-gallon stills. The inventor said he would disclose the nature of the substance mixed with the kerosene in his process as soon as he had obtained a patent.

TAXICABS TO BE HEATED

New York, Feb. 4—Heated taxicabs will be an innovation in this city very shortly as the result of an order for 240 heaters, manufactured by the Perfection Spring Service Co. of Toledo, by the Fifth Avenue Bus Co., of this city.

One Tire Co. Reduces

Kelly-Springfield Drops Price 10 Per Cent from the January Figure

Increase by Other Makers of Casings and Tubes

NEW YORK CITY, Feb. 7—Kelly-Springfield tire prices have been reduced 10 per cent on the popular sizes, making the present list about 15 per cent higher than the old prices in effect before announcement of its rise on January 1. The 30 by 3 size, plain tread, is now listed at $15.20 as compared with $16.35; 34 by 4 is $29.65, the former price being $32.95; and the 36 by 4 is now $31.50 as against $35, formerly. On the non-skid types, the 30 by 3 is $18.10, the 34 by 4 is $36.25 and the 36 by 4 is $38.20.

Nassau prices have been raised 10 per cent. Portage tires are also 10 per cent higher. The tubes have been raised 15 per cent. Braender has raised its prices 15 per cent. Combination prices have gone up 10 per cent.

Swinehart is one of the few companies which still adhere to the old prices. It is stated that no changes in the near future are contemplated at present by this concern.

FIRESTONE HEADS RUBBER CLUB

New York, Feb. 4—The Rubber Club of America has elected the following officers: President, H. S. Firestone, Firestone Tire & Rubber Co.; first vice-president, Van H. Cartmell, Kelly-Springfield Tire Co.; second vice-president, H. L. Hotchkiss, United States Rubber Co., and secretary and treasurer, H. S. Vorhis. G. B. Hodgman was president last year and H. S. Firestone and Van H. Cartmell were first vice-president, and second vice-president, respectively.

PREST-O-LITE WINS INJUNCTION

Indianapolis, Ind., Feb. 5—The customary injunction against refillers of its tanks was granted to the Prest-O-Lite Co., Inc., by the United States district court for the district of Indiana, January 31, against the Sun Lite Gas Co., Indianapolis, and O. K. Stuart, its president, and other officers and employes.

The Prest-O-Lite Co. charged in its suit that in addition to doing some refilling, the Sun Lite Co. was engaged in selling apparatus to others under false representation, and encouraging the use of such apparatus in refilling Prest-O-Lite tanks. The injunction granted not only restrains the Sun Lite Co. from infringing in any way upon the Prest-O-Lite trademark rights, but also restrains it from inducing others to infringe.

Extend Yellowstone Trail

Slogan of Highway Now Is "From Puget Sound to Plymouth Rock"

Third Annual Meeting of Association Arouses Enthusiasm

MINNEAPOLIS, Minn., Feb. 5—At the annual meeting of the Yellowstone Trail Association, which concluded its annual session here yesterday, the present route from Seattle and Tacoma to Chicago was extended to Boston, or to be more accurate Plymouth Rock, Mass., thus literally fulfilling the old slogan of the highway, "Puget Sound to Plymouth Rock."

The route from Chicago east was selected by vote of the delegates present and does not follow the main eastern highway through Cleveland, Buffalo, Rochester, Utica, Albany and Springfield, Mass., to Boston, but is south of this, going through the southern tier of counties in New York state, crossing the Hudson river at Poughkeepie and thence through Connecticut and Rhode Island to Providence and Boston.

This less-known route was selected on the report of M. J. Dowling, banker of Olivia, Minn., who traveled both routes last summer, and favored the southern one because it is possible to use the Yellowstone Trail road markers on it, whereas these markers cannot be used on the northern route, owing to the New York and Massachusetts roads already having all the markers the commissioners want. Highway markers have to be registered in these states and they have refused to register any more on this route. The general sentiment of delegates present was that it would be preferable to be the big frog on the southern New York state route than nothing at all on the central or main route.

Convention Well Attended

The annual convention of the association, extending over 2 days, was successful, over 100 delegates attending, representing fifty-one towns and cities along the route and coming from six states. The association hopes to greatly improve its finances by a new scheme of management in which a paid secretary, H. C. Cooley, Aberdeen, S. D., has been appointed.

During the 3 years of its existence, the Yellowstone Trail Association has built through its influence, not its own funds, over forty cement bridges on the route and its program for this year will embrace a continuation of this work. Much of the route has been graded in the agricultural section and this sanded, a process of covering the surface with 5 inches of sand which mixes with the loam and makes a good road even in medium rains.

The Yellowstone trail in its course from the Twin Cities to Seattle goes through the center of the scenic Bad Lands of South Dakota and Wyoming, follows the Yellowstone river for upwards of 300 miles, passes but 53 miles north of the north entrance of the Yellowstone national park at Livingston, Mont. A day's journey further on is Missoula, Mont., where you turn north on a short day's run to the Glacier national park, and the end of the route leads almost direct to Mount Rainier and Washington national park in Washington.

Route of the Jefferson highway from Minneapolis to the Gulf

"From Pine to Palm"

Route of Jefferson Highway Established by the Convention

Road Connecting Minneapolis with New Orleans Located

KANSAS CITY, Mo., Feb. 4—The route of the Jefferson highway from St. Paul to New Orleans was chosen at a meeting of the directors held at the Hotel Muehlebach, in this city, yesterday. Omaha was eliminated as a contestant for the road and one section was designated as being left to the route building the best road.

The Kansas City meeting was attended by the forty directors from ten states and nearly 400 delegates from the districts through which the road will pass. The selection of the highway came only after spirited discussion as to what states and towns it should include and enthusiastic promises that actual improvement along permanent lines would start at once. The directors officially named the route as follows:

Official Route

St. Paul and Minneapolis to Kansas City, via Interstate Trail through Des Moines and Mason City, Iowa. This eliminates Omaha and Chillicothe, Mo.

Kansas City to Joplin, Mo., both Missouri and Kansas routes, one through Nevada, Lamar and Butler, Mo., and the other through Pittsburg, Girard, Fort Scott, Pleasanton and Olathe, Kan.

Joplin to Denison, Tex., through these Oklahoma towns, Miami, Welch, Vinita, Pryor, Wagoner, Muskogee, Checotah, Eufaula, McAlester, Atoka, Caddo and Durant.

Denison to Greenville, Tex., through Sherman, Whitewright, Trenton, Leonard, Celeste, Kingston and Kellogg.

Greenville, Tex., to Shreveport, La., on contesting route building the best road.

Shreveport, La., to New Orleans, through Greenwood, Keithville, Mansfield, Pleasant Hill, Montgomery, Colfax, Alexandria, Bunkie, Melville, Port Allen and Baton Rouge.

The meeting here was presided over by E. T. Meredith, of Des Moines, president and originator of the Jefferson highway idea. So strenuous became the discussions over the routes to be selected that Mr. Meredith threatened to resign during a tumultuous session of the directors.

Arkansas was left out entirely, although it had fifty delegates here who demanded to be permitted to build and designate a section of the route from Joplin to Shreveport. They left the city declaring the road would be built whether or not it was made a part of the highway. Likewise Nebraska and North and South Dakota delegations wanted to build northern sections of the road.

The Jefferson Highway Association was formed here and Des Moines was chosen as the official headquarters. A road manager who will take over the active work of making it a 365-day road will be chosen by the president.

The route will be marked from north to south with markers showing a pine tree and a palm tree, carrying the slogan, "From Pine to Palm."

Great Northwest, Richest Market for Motor Car Maker

Minneapolis Show Mecca of Deale rs and Buyers from Realm Where Bumper Crops Make Bank Rolls Loose

By David Beecroft

MINNEAPOLIS, Minn., Feb. 5—The annual Minneapolis motor show, drawing its thousands of dealers and tens of thousands of citizens from the great northwest territory, served by the Twin Cities and embracing all of the state of Minnesota, all of North Dakota and South Dakota and the eastern half of Montana, to which might be added the northern counties in Wisconsin, it is perhaps the most potential show west of Chicago. It is a greater gathering point for dealers than Kansas City, Omaha, or Des Moines, and is a veritable magnet for the public throughout the territory, a public which does all of its buying in the Twin Cities and looks to them as New England looks to Boston, as the south looks to New Orleans and as the Rocky Mountain section looks to Denver and Salt Lake City.

The Get-Together Week

Naturally, this week's motor car show, with its sixty-four different makes of gasoline cars, its four makes of electrics, its six different makes of motor trucks and its two makes of tractors for the farm, not to mention a small outside tractor show, gives the 4,000,000 from these states the best opportunity to view the show, to shop in the Twin Cities and to meet their friends. Show week is the great get-together event of the year for the Northwest. Hotels are crowded by reservations booked weeks in advance, theaters play to sold-out houses, lodging houses are at a premium, and the great Northwest measures its strength and takes inventory of itself on show week as it does on no other week of the year.

It is mete that this greatest of all distributing territories for motor cars should have an annual week that measures up with any other city outside of New York and Chicago and the possible exception of Boston, which has more cars on exhibition at its annual show.

These are the greatest years that the Northwest has ever known, and the more conservative bankers of the Twin Cities show you figures which go a long way to establish the fact that it is questionable if there is any other territory on the earth's surface in this or any other country where prosperity of all classes has reached so high a mark as in our own Northwest during the past 18 months.

The prosperity of the farming communities is staggering. Crops in 1914 were record breakers and sold at high-mark war prices, but 1915 crops were often 50 per cent higher and while prices have been a little lower the sum total of crop value for 1915 is vastly in excess of 1914. These two have been years without precedent. The land owners in the agricultural sections of Minnesota, the Dakotas and Montana have fallen into unexpected wealth, just like the eastern stock speculator who bought General Motors or Bethlehem steel when these stocks sold under a dollar and watched them steadily climb to 500 or higher.

From Mortgages to Motor Cars

Some farmers, who bought "quarter sections," or 160-acre farms 5 years ago and who for two or three seasons were not able to pay interest or even taxes, have within the last 2 months not only paid off all taxes and interest charges but entirely paid for the land. This means that all other bills have been paid and that the proud possessor has a snug bank account.

The condition of a great territory is always reflected in the financial reports of the territory, and the Twin City banks are always a sure criterion of the financial condition of the Northwest. E. W. Decker, president of the Minneapolis Loan & Trust Co., whose estimate of money conditions in the territory stands highest, says there never was a period when the Northwest was in such good financial condition. Scores of the small country banks are carrying deposits of $500,000 with the large Twin City banks, an undreamed-of condition. In the four states money is more plentiful than ever before. The interest rate on mortgages in parts of Minnesota has dropped from 6 to 5.5 per cent, and to as low as 5 per cent in a few sections. There has been a more general paying up of old debts of 4 or 5 years standing than ever before; in fact, back debts are no more.

Crops Mean Money

When in Rome do as the Romans do and when in Minneapolis, you must think as the Twin City people do. Here you think crops, the production of the soil. Money and crops are synonymous. If you sell motor cars, you must think crops because farmers own over one-half of the 95,000 motor cars in the state of Minnesota. Statistics do not give the farmer percentage in the Dakotas and Montana, but it is equally high if not higher.

Perhaps before analyzing what crops were last year and what they are expected to be this year, we can get a better realization of their value by glimpsing at what crops have already done in increasing the number of motor cars in the state of Minnesota. Today Secretary of State Julius A. Schmall states there are 95,000 cars in the state. A year ago there was but 68,500 machines. The increase in the past year has been 28,500, an increase of 40 per cent during the year. The secretary estimates that 35,000 cars will be sold in 1916 and he is a good estimator. A year ago he predicted 100,000 cars in the state by January 1, 1916. Unquestionably this total would have been reached had the dealers been able to get all of the cars they could have sold. Pence, the large Buick distributer, claims he could have sold 2,000 more cars if he could have obtained them. Overland, which stands next to Ford in the territory, could have disposed of several thousand more. The same is true in proportion with many other concerns of smaller output.

Glance over the growth of motor car

Here you think crops, the production of the soil. Money and crops are synonymous

registrations in Minnesota since 1909 when registration was commenced:

1909	7,000
1910	12,500
1911	19,000
1912	28,400
1913	45,800
1914	68,500
1915	95,000
1916 (Estimate)	130,000

These figures of growth tell best their own story. To them you can add 2,000 registered chauffeurs and 474 registered motor car dealers.

Looking at the present 95,000 cars owned in the state, a further analysis shows that the farming community is a very great buyer. It is stated that an analysis shows 36,000 cars are registered in towns of 1,000 population or less. The majority, in fact, nearly all of these cars, go direct to farmers. The relative number of cars owned in small towns and in the three large cities, Minneapolis, St. Paul and Duluth, proves the farmers' case still further. These three cities have a combined population of 700,000. The total farm population of the state is 750,000. The total number of cars owned by the farmers is 46,000, whereas these three cities have but 20,000. The farmers are two and one-quarter times as strong in car ownership. In the towns of 1,000 population or under, the people are buying cars today at the rate of one car to every thirty-five people. It is estimated that by 1926 there will be one car for every ten people in the state of Minnesota.

Room for More

But Minnesota farmers are not anywhere near the saturation point, so far as car buying is concerned. There are 156,000 farmers in the state. The average farm contains 177 acres. The average value of a farm in 1910 was $9,500. Of these 156,000 farmers, it is conservative to estimate that 100,000 can afford to buy cars within the next 5 years. Today 46,000 of these farmers have cars and 54,000 are waiting to buy.

Perhaps a brief analysis of how certain makes of cars have increased in the state during the past year will serve as a better indication of what may be expected this year and next. Ford registrations have increased by 12,000 cars, 2,500 of these going to the large cities and 5,500 to towns of less than 1,000. Overland has increased 2,545, 311 going to the large cities and 1,522 to the towns of less than 1,000. Dodge has registered 948 during the first year of its sales: Maxwell has made an increase of 1,291 in the year. Studebaker has increased 2,636, Reo 518 and others in like proportions. Here are some of the makes that lead in registrations in the state:

Ford	30,708	Chalmers	826
Overland	7,518	Regal	787
Buick	6,686	Kissel	718
Studebaker	5,637	Packard	653
Maxwell	3,551	Saxon	664
Reo	2,380	Velie	637
Cadillac	1,597	Paige	613
Chevrolet	1,284	Krit	563
Oakland	1,075	Imperial	542
Mitchell	983	Metz	516
Dodge	948	Oldsmobile	505
Hudson	917	Jackson	505
Hupmobile	893	Jeffery	440

These figures show that farmers must be buying cars selling for more than $1,000 and a straw vote of the Minneapolis distributors, exhibiting at the show, was conclusive to demonstrate that farmers are gradually mounting in the price scale, and that many farmers own cars listing at more than $1,000.

Minnesota is typical of middle western states that do not pay too much for motor car registration. She has a tri-annual system, a registration fee of $3 having been sufficient for 3 years, or a dollar-a-year rate. The present tri-annual registration dates from January 1, 1915. Beginning with the next tri-annual period January 1, 1918, the registration fee has already been fixed at $5 for the 3 years. Registration for the last 2 of the 3 years will be $3.50. In Minnesota the license tags belong to the person registering and do not go with the car in case of sale.

Biggest Distributing Territory

During the past year the Twin City territory has advanced into a new position in the motor car field by becoming the biggest distributing territory in the country for several makers. Manufacturers are beginning to appreciate the importance of the territory. It is several years since Ford established its large assembly plant here. Preparations are being made to practically double its size.

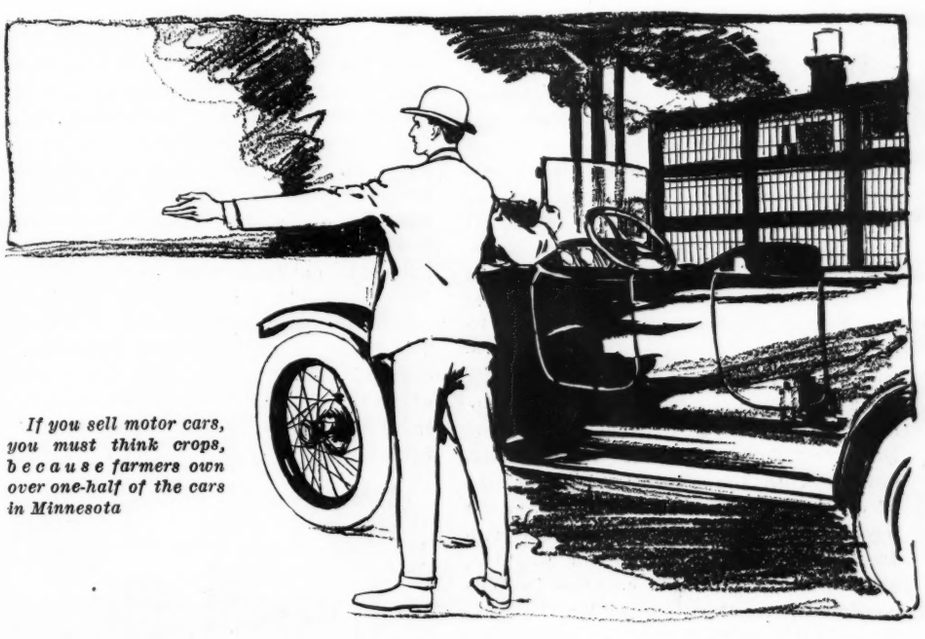
A step, which well indicates the importance of the Twin Cities and the buying capacity of the Northwest, is the erection of the mammoth store building last fall by the Willys-Overland Co. and only recently occupied. Here is a huge brick structure four stories high and capable of storing 7,500 motor cars, held for quick shipment to the hundreds of sub-distributors and dealers in the four or five states served. The new building is a model of its kind and the only one of its particular type in the country. It is an impressive structure, 462 feet long and 280 feet wide, occupying one of the most commanding positions on University avenue, the connecting thoroughfare between Minneapolis and St. Paul. The building is just over the dividing line and stands on St. Paul territory. Although a four-story building, it is much higher from a car storage viewpoint as its storage floors are double-decked, the second deck on each floor being of suspended steel frame work with the long lines of cars carried on two 4 by 6-inch angle pieces. The entire scheme is such that one man can easily push any car off the railroad car from the switch lying along one whole side of the plant, to the elevator, and thence to any part of the storage space.

Across the front, on the ground floor, is a mammoth show room, and over it on the second floor are the offices. The basement has a large battery room, and is also used for tuning motors and is half given over to car storage. On the main floor is a stock room, 140 by 60 feet, for spare parts for the territory. Cars are at present being received at the rate of fifty per day and there is a force of twenty-two men looking after the plant. The salesroom or offices have not been opened. The territory served includes Wisconsin, Minnesota, Iowa, Montana and the two Dakotas.

Others Establish Assembly Plants

But there have been other motor car activities during the past year. Chevrolet is at present negotiating for a site on which to erect one of its assembly plants; and real estate people are arranging with the Maxwell company for larger arrangements for representation in the northwest.

Another motor aspect that has developed in Minneapolis and St. Paul during the past year is the agricultural tractor business. The Twin Cities are today the acknowledged home of the agricultural tractor industry, just as Detroit claims



If you sell motor cars, you must think crops, because farmers own over one-half of the cars in Minnesota

similar distinction in the motor car trade, Pittsburgh in the steel industry, Chicago in live stock and New York as the financial center. Today there are over twenty-five concerns building agricultural tractors and every week brings a new one to the surface. Nearly every back-yard machine shop has a tractor in development; in fact, tractor development is as rampant here today as motor car promotions were in Detroit 4 years ago.

The amazing crops of the last two years have been largely responsible for this development, although the tractor industry in the Twin Cities is over 5 years old, many having been built 8 and 9 years ago. The largest producer, making the Bull tractor, will build approximately 5,000 next year and the output of others will range from this figure down to ten machines. There were several makers that put on twenty last year, others that built forty, and others that went over the 1,000 mark.

A rapid development of the tractor industry is looked for. The farmer is a heavy car buyer. He has learned the utilitarian value of the gasoline engine. It is not necessary to sell him the engine. It only requires time until he has enough ready cash to replace his horses with gasoline power.

Tractors a Big Factor

The trend of agricultural tractor development will unquestionably follow closely the trend exhibited in passenger cars and also in motor trucks. Already the low-priced machine has arrived in volume. The old price of $3,500 has been cut until now you can buy machines for less than $600. The bottom limit has not yet been reached, but it is certain that the $500 tractor will be the big-volume type. This fact is already realized by the tractor makers and there is more activity in this field than in that of the low-priced motor car.

A point of particular interest to motor car dealers is that tractor makers are turning more than ever before to the motor car dealers as the person to market the tractor. In the past the implement dealer has sold them, but the motor car dealer is accepted as having a better knowledge of the gasoline engine, as having better service facilities, and being generally in a better condition to market the low-priced tractor than the implement man. The motor car dealer sells more than one-half his cars to the farmer and taking on the tractor line will be quite in harmony with the present movement in the development of his business.

Having noted the very general development of the motor car business in the Northwest during the past year, we must next look to the all-convincing question of crops to get a correct estimate on the buying capacity of Minnesota, the two Dakotas, and the eastern half of Montana, as well as the northern counties in Wisconsin, the territory served by the Minneapolis distributors.

Mineapolis and Duluth are the two great primary grain markets for this territory. The products of the farm reach these two cities and it is from them that Chicago, Liverpool and the other great grain-buying cities secure their supplies.

Some conception of what grain has been grown in this territory in 1915 can be had from the fact that between September 1 and January 1 there were 264,000,000 bushels of grain shipped from the farms and delivered in Minneapolis and Duluth. In Minneapolis alone 160,000,000 bushels arrived in these 4 months. That meant 40,000,000 bushels a month. It meant that every day during those 4 months a million and one-third bushels of grain was arriving in Minneapolis. It is a staggering total even to blase grain merchants in this city. But this total does not in any way represent the total volume of grain because the farmers are holding wheat and oats for higher prices.

Perhaps dollars will speak plainer to your motor car-tuned ears than bushels: Here are a few examples of how the 1915 crop has quite outdone the bumper crop of 1914. The December 30 federal government report gives the value of wheat to the farmers for Minnesota alone at $66,078,000 as compared with $43,834,000 for 1914. Here is an increase in dollars of over $22,000,000. This represents more than a 50 per cent increase in value over 1914.

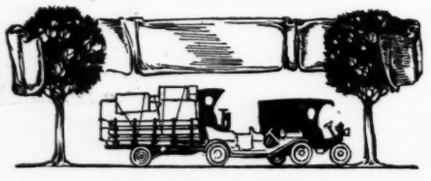
Now turn to North Dakota; For 1915 the wheat value at the farm was $132,214,000. In 1914 it was $82,408,000. Here is an actual dollar gain of $50,000,000. It is a gain of over 60 per cent in 1 year.

Turn now to South Dakota: The figures for wheat are $54,835,000 for 1915 as compared with $29,672,000 for 1914. Here the output was nearly doubled in a year.

Lastly, look at Montana and her wheat gain: The figures are $26,384,000 for 1915 as compared with $16,704,000 for 1914. Here is another gain of over 60 per cent in the year.

A Hundred-Million Gain

Now recapitulate: Here is $107,000,000 more for wheat alone in these four states than a year ago. These figures are not speculations, they are established facts. But this $107,000,000 means more to the motor car dealer today than it would have meant a year ago. Today the farmer's financial decks are cleared. Last year from his bumper crop he paid his back payments on land, paid back taxes, redeemed his old notes, paid his old implement bills and feathered his bank account. This year he starts without these handicaps of former years. Of this volume of wheat money, which represents but a small percentage of crop value that the farmer has, a good percentage is going into motor cars and more next season.



No longer is the banker talking against the motor car. Today he is the greatest booster for it. He now sees it as a utility, an investment. These same bankers today see the time when the agriculture tractor will be considered a sound financial investment to these same farmers. The tractor will enable them to work night and day with relays of men and The same program can be followed in harvest time. The tractor will permit of deeper plowing and better cultivation of the soil; in fact, in divers ways the tractor will prove a great improvement over the present horse regime. At present the farmers' horses work 100 days in the year. They are idle 265 days. They must be fed these 265 days. Feeding them costs nearly as much when idle as when working. Herein is one of the great assets to the tractor argument. It is not piling up maintenance costs while idle.

But other crops are selling in advance of the 1914 mark. The oat crop value on the farm is $17,000,000 more for 1915 than 1914. The Northwest is the great center of the flaxseed industry of the country. Its value last year was $24,000,000 as compared with $19,000,000 for 1914. Over 99 per cent of this industry is in the Northwest and served by the Twin Cities and Duluth.

Area Greater Than Germany

Summarizing a few of the crop figures we discover that for 1915 the total of eight crops aggregates 589,428,000, well over half a billion dollars. These crops included in this total are wheat, oats, corn, barley, flax, hay, rye and potatoes.

Physically the northwest territory is as stupendous as the value of its products. It is a giant in dimensions. From Minneapolis to the limit of the territory in Montana is a 20 to 24-hour ride on the limited trains. In area the states of Minnesota, North Dakota, South Dakota and one-half of Montana, to which is added a fringe along northern Wisconsin, exceeds the area of France or Germany. You could set six New England states in this area.

So great is this area—306,134 square miles to be exact—that you could put the whole 100,000,000 population of the country in it and there would only be 329 persons to each square mile. The population would not be nearly so dense as the present population of the state of Massachusetts which has 418 persons to the square mile. It would scarcely equal New Jersey with 337 persons to the square mile. It would fall far short of Rhode Island with its 508 persons to the square mile.

Thus do we get some slight conception of this enormous Northwest with its empire dimensions and its city population of but 4,000,000. Its fertile fields can accommodate twenty-five times this number and then not suffer from congestion. Why should not our motor car makers, with an eye to the future, seize upon this great logical center for distribution and perhaps assembly?

Show Circuit Flourishing

Kansas City Opens with Record Attendance

Minor Exhibitions Throughout the Country Make Sales

KANSAS CITY, Mo., Feb. 7—Special telegram—The Kansas City motor car show, which opened here today, is largest in the history of the city with 192 vehicles shown, including thirty-two commercial vehicles and fifteen electrics. Many dealers already have arrived from western Kansas, Oklahoma and northern Texas. Many retail sales are reported today in spite of cold weather and a much larger attendance than last year is looked for. Buying has been better last month than a year ago, the closed car business has increased heavily. There is a very large crowd tonight, all four floors of Case building being crowded. The agricultural tractor show opened in a large tent with a good crowd.

BRITISH EMPIRE'S ONLY SHOW

Montreal, Que., Can., Feb. 4—The Montreal motor show closed Saturday evening, celebrated as American night, after the most successful exposition held in the city since the inception of these annual events, in the numbers which crowded the show during the 6 days, and in the number of sales put through and prospects. It was the only motor show being held this year in the whole of the British empire, and the burden which fell on the shoulders of the energetic directors of the Montreal motor show, that of upholding the prestige in the motor world of Great Britain, was borne in a highly creditable manner. The attendance throughout the week was approximately 50,000 persons. A canvas of the agents of the various makes of cars shown revealed unusually successful results from the exhibition. Most of the cars had sold heavily during the week and the number of good prospects in sight as a direct result of the show exceeded that of last year, in one case, by as much as 200 per cent. Cash sales were considerable.

BOSTON CROWDED FOR SPACE

Boston, Mass., Feb. 5—The problem of how to house all the applicants for space at the Boston motor car show is not yet solved, although a partial plan has been worked out. For the first time there will be cars in the balcony this year. A few years ago a couple of dealers exhibited a few cars upstairs, but not very many. This year so far seven exhibitors have been given space there. It is more advantageous than going into another building, for the balcony circles the main hall, so that the cars may be seen.

The Mitchell dealer, F. P. Lucas, has been able to get the entire Paul Revere hall upstairs, that had been formerly given over to electrics and accessories, but in order to get it he had to file a bond that the surface of the floor would not be damaged, as the hall is used every night except show week for dancing parties. The accessories will be crowded a bit because of the cars going upstairs, but there will be plenty of room for the accessory people.

At the present time just 107 exhibitors of passenger cars and trucks have been allotted space and there are applications on file for at least forty more. There will be seventy-four different makes of passenger cars and thirty-three makes of trucks, so that all told more than 400 machines will be on view. The accessory list has reached 175 exhibitors. If the other applicants not in the show agree to go into another hall as an overflow, Manager Campbell will try to secure Horticultural hall that was used some years ago.

YORK SHOW A SUCCESS

York, Pa., Feb. 5—Motor car and accessory dealers, exhibiting at the York automobile show this week, pronounce it the most successful show ever held in York from every standpoint. The show was held in the tabernacle garage of the J. W. Richley Auto Co. and was attended by approximately 8,000 persons during the 5 days of the show. The show was the first to be held by the York Automobile Dealers' Association and was the third exhibit to be held in this city.

The twenty-five automobile dealers and fifteen accessory exhibitors closed much business throughout the week and the number of car sales amounted to between fifty and seventy-five.

SHOW PLEASES FREDERICK

Frederick, Md., Feb. 4—Success attended the second annual motor show held in Frederick, last week. This year's attendance at the show, which was held in the Armory, far exceeded last year's crowd and also resulted in big sales being made by the exhibitors. All of the exhibitors, which numbered about twenty-five, say this year's show found business much better than last year and besides the sales made a great number of prospects were gathered in. The show was to have concluded Friday night, but was kept open throughout Saturday, due to the demand of the dealers and the public from the surrounding country.

SELLS 19 CARS AT SHOW

Chicago, Feb. 7—Averaging better than two sales daily for 7 days, Walter J. Felton, a salesman for the Overland Motor Co. of Chicago, has been awarded a special cash prize for selling the largest number of cars at the Chicago motor show. By booking orders for nineteen cars, Mr. Felton broke all previous records of the local Overland agency for show sales.

Trade News of the Week

Ogren Site in Waukegan Subject of Dispute

Carter to Handle Own Sales to Car Manufacturers

WAUKEGAN, Mich., Feb. 7—In connection with the plans of the promoters of the Ogren Motor Car Co. to proceed with the erection of a factory on the Morrow flats, it is predicted that some interesting developments may ensue, but it is said the men backing the project are determined to rush matters with all possible speed in an effort to beat out any legal controversy that might arise.

The fact is that the title to the land has not passed to the company from James Morrow, and the promoters recently made announcement of a determination to proceed with the building plans, using the contract which Mr. Morrow signed for John Douglas and William Parker, and which has been recorded, as the basis on which rights are claimed to the land.

According to those back of the factory project Morrow was to give the factory site free in order to open up the flats. Then a tannery was started which automatically opened the flats, following which it is declared that Morrow tried to abrogate the contract and place a price of $500 an acre on the site.

CARTER TO HANDLE OWN SALES

New York, Feb. 4—The Carter Carbureter Co., of St. Louis, Mo., has cancelled the selling arrangements which it has had with the H. W. Johns-Manville Co., of New York for 2 years past and has arranged to market its products this year through its own sales department. The H. W. Johns-Manville Co. will continue to sell Carter carbureters and Carter gravity tanks, but will no longer handle the sale of these commodities to manufacturers.

H. C. Weed, general manager of the carbureter department of the H. W. Johns-Manville Co., will continue to direct the sales policy of the Carter company, in the capacity of vice-president and general manager with offices at the factory in St. Louis. The company will make a specialty of service, with factory experts located in every large city in the country under the direct supervision of the service department at the factory.

RANKIN SUCCEEDS MAHIN

Chicago, Feb. 7—John Lee Mahin, founder of the Mahin Advertising Co., has sold his interests to William H. Rankin, and retires at once from the presidency of the organization. He will ultimately locate in New York and open an office there. Mr. Rankin, the new president, has been vice-president during the last 17 years.

Define Amateur Driver

Dealers Will Not Be Permitted to Compete in Chicago Speedway Event

Motor and Athletic Clubs in West Invited to Enter Cars

CHICAGO, Feb. 9—In the promotion of an amateur race for the Western Interclub trophy, scheduled for May 20, the management of the Chicago speedway and the contest board of the Chicago Automobile Club have been forced to define an amateur in order to pass upon the entries and keep the contest even more unadulterated than a certain brand of soap, advertised 99 4-100 per cent pure.

Following the precedent made by the golf and tennis associations that a dealer in golf or tennis goods is a professional, the promoters of the amateur race have ruled that anyone identified with the motor car industry is not eligible to participate in the chase for the Western Interclub trophy. This decree bars dealers and engineers but in order that they may have an opportunity to display their skill, a special event will be scheduled for them and run in connection with the amateur race.

Invitations have been sent to all the motor and athletic clubs in this section of the country and to organizations having a motor committee to nominate cars and drivers for the amateur race. These nominations will be passed upon by an eligibility committee and if acceptable, the entrant will sign an entry blank. The rules stipulate that the driver, mechanician and pit attendants shall be members of the club in the name of which the car is entered and that the driver must be the owner of the car which he nominates for the race.

The race will be a free-for-all and run in three preliminary and one final heat. There will be no purse or accessory money given.

With the republican national convention opening June 7 and the second annual Chicago motor derby scheduled for Saturday of that week, June 10, David F. Reid, president of the local speedway association, wishing to give the race thrill-seekers an even run for their hotel reservations with the presidential slatemakers, yesterday made arrangements to establish a hotel information bureau at speedway headquarters, where out of town spectators may obtain up to the minute information on hotel accommodations and make room reservations by mail, telephone or telegraph.

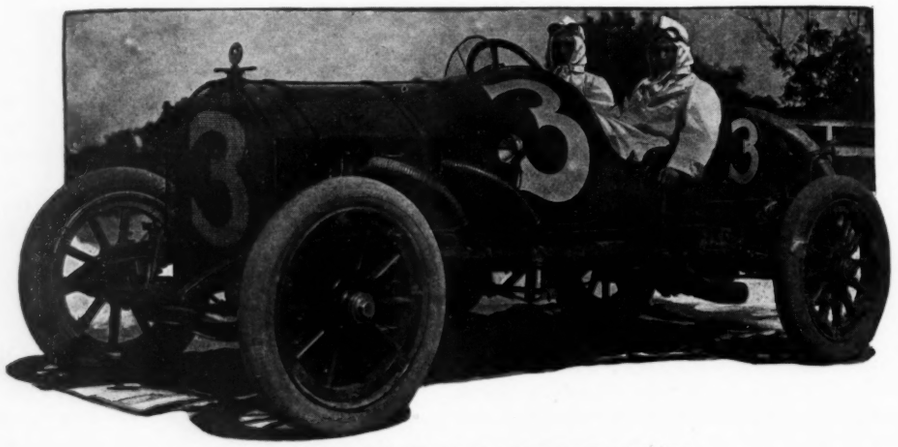
The bureau probably will be opened when the tickets are first placed on sale. The hotels have agreed to co-operate with the speedway management and each day will make a report on how many rooms are available during the week of Chicago's double attraction.

Purse and Admission Cut

Not only has the distance and purse of the 1916 race been reduced, but the speedway directors have cut the admission prices as well. No gate admission will be charged for this year's event, whereas in 1915 it cost $2 to get inside the grounds and an additional expenditure was necessary if one wished to have a seat in the grandstand or bleachers. The following scale of prices have been decided upon for the June 10 contest:

Box seats, including admission, $7, $8 and $10; grandstand seats, including admission, $3.50, $4, and $5; bleachers, $1.50 and $1; paddock, $2 and $1; parking spaces, $5 and $10.

This represents a cut of approximately 50 per cent from the admission prices that prevailed last year, when the choicest box chairs sold for $25 and the best grandstand seat cost $10. The cheapest bleacher seat in 1915 represented a total outlay of $3, as $2 was charged for general admission.



SPEED KINGS IN THE REALM OF THE MIKADO

Motor car racing, like baseball, has been introduced to the inhabitants of Japan, the first contests being held in connection with the coronation of the mikado.. A Stutz, driven by T. Watanabe, showed the way to the field in several events. The car is the one piloted by Gil Anderson at Santa Monica in 1912 when Teddy Tetzlaff captured the premier race on the card

Cups Not for Speedway

Vanderbilt and Grand Prizes Race Will Not Be Held on Improved Tracks

Corona Changes Date of Coast Contest to April 8

CHICAGO, Feb. 7—Neither the grand prize nor the Vanderbilt cup will be hung up for speedway competition. This is the announcement brought west from New York by G. R. Bentel, manager of the Los Angeles speedway and representative of the Corona Road Racing association, who traveled across the continent in hopes of securing the grand prize for the Corona contest, which has been classified as a boulevard or semi-speedway race by the contest board of the A. A. A.

As a consequence, Bentel's long trip was futile as the Motor Cups Holdings Corp., which controls both the grand prize and the Vanderbilt cup, refused to grant Corona's request for a grand prize race sanction. The ruling in regard to the historic trophies also upsets plans of the New York speedway directors to hold the Vanderbilt cup classic on the Sheepshead Bay course this season.

Corona will run a grand prize race, however, which will be known as the Corona grand prize. In addition to the $12,000 in prize money that has been voted, the Flagler trophy will go to the winner. The contest will be a free-for-all and the distance the same as in 1914, 301 miles. The purse will be split as follows: First, $5,000; seconds, $3,000; third, $2,000; fourth, $1,000; fifth, $700, and sixth, $300.

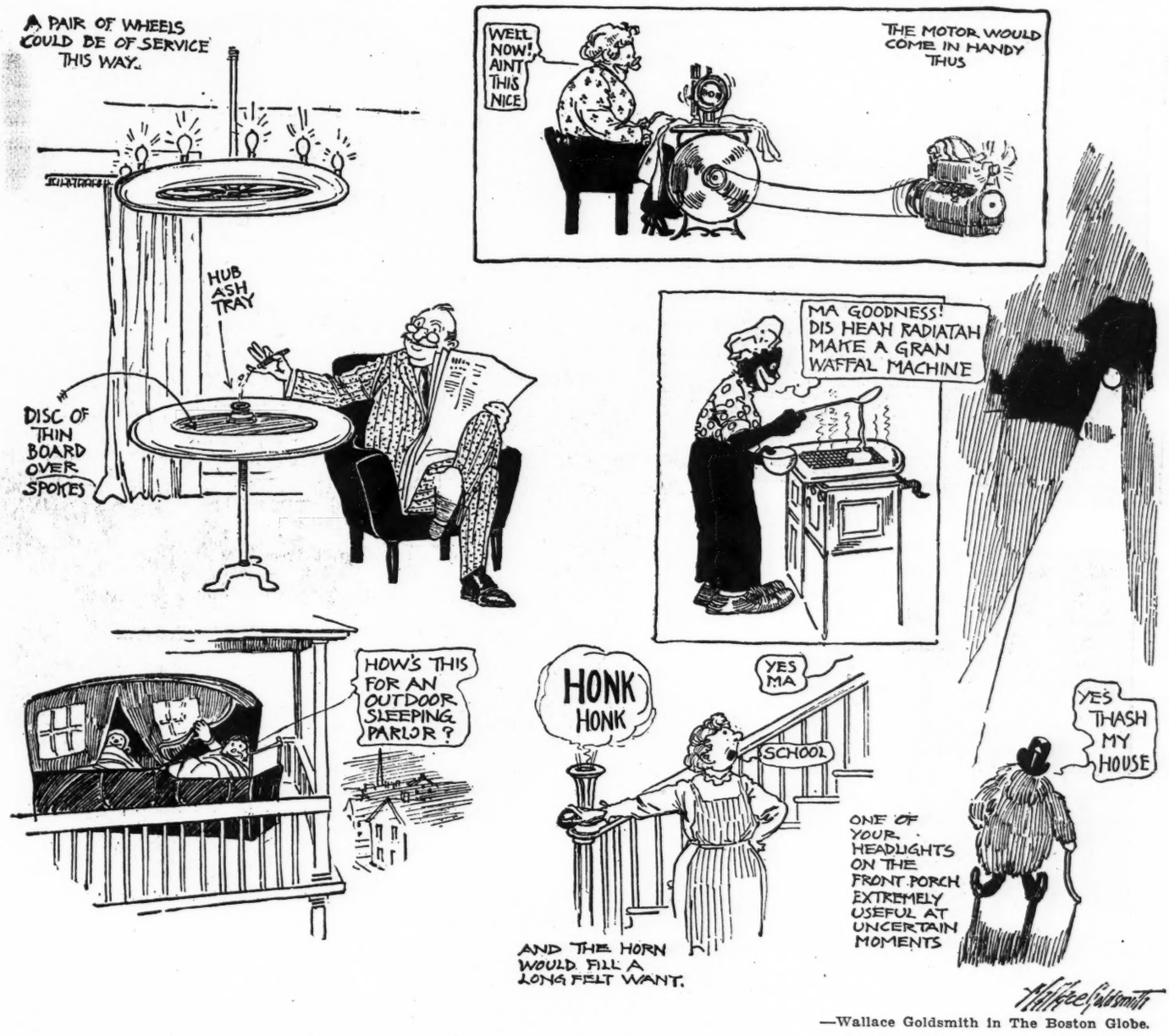
Upon his arrival in Chicago yesterday, Bentel received a telegram from Corona acquainting him of the fact that the date of the Corona race has been changed from March 17 to April 8 so that the Corona event will not conflict with the series of meets to be held on the Los Angeles speedway, all of which will be run prior to April 1. The Los Angeles promoters already have received a sanction for a February 22 race and have reserved two additional dates in March. Each of the three events probably will be 100 miles in distance and for $5,000 in purses.

BURMAN TO DRIVE PREMIER

Indianapolis, Ind., Feb. 7—Bob Burman will be at the wheel of one of the two Premier Specials, the construction and campaign of which is being financed by the Indianapolis motor speedway, during the coming season. He already has signed a contract to drive for the local race promoters and will come to Indianapolis to assist in building the two mounts after participating in the Los Angeles event February 22 and the Corona grand prize.

Burman has just completed the reconstruction of his Peugeot.

The All-Year-Round Car as the Cartoonist and Rhymster See It


A PAIR OF WHEELS COULD BE OF SERVICE THIS WAY.
HUB ASH TRAY
DISC OF THIN BOARD OVER SPOKES
WELL NOW! AINT THIS NICE
THE MOTOR WOULD COME IN HANDY THUS
MA GOODNESS! DIS HEAH RADIATAH MAKE A GRAN WAFFAL MACHINE
HOW'S THIS FOR AN OUTDOOR SLEEPING PARLOR?
HONK HONK
YES MA
SCHOOL
AND THE HORN WOULD FILL A LONG FELT WANT.
YES THASH MY HOUSE
ONE OF YOUR HEADLIGHTS ON THE FRONT PORCH EXTREMELY USEFUL AT UNCERTAIN MOMENTS

—Wallace Goldsmith in The Boston Globe.

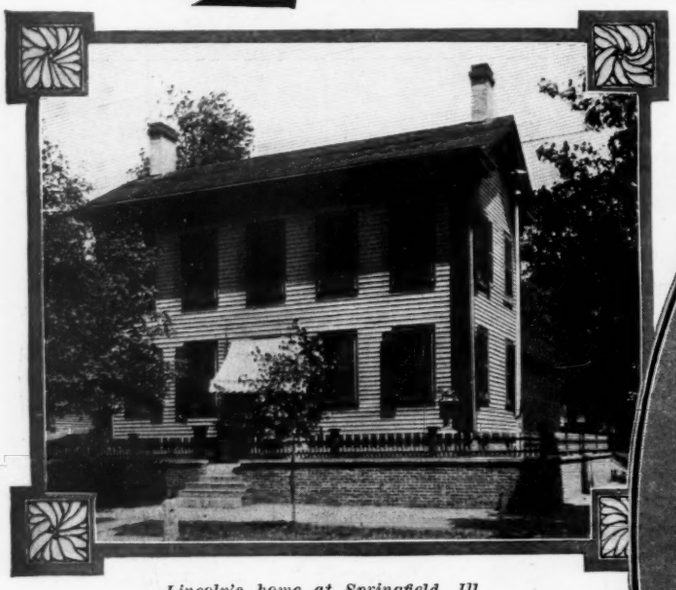
By James T. Sullivan

WE must put the car up for the winter, ma,
But not in the same old way,
No longer it goes in the back of the barn,
Along with the oats and hay.
I'll take it apart and make use of it,
While the cold weather is here,
There's many a way it will earn its keep,
During the rest of the year.

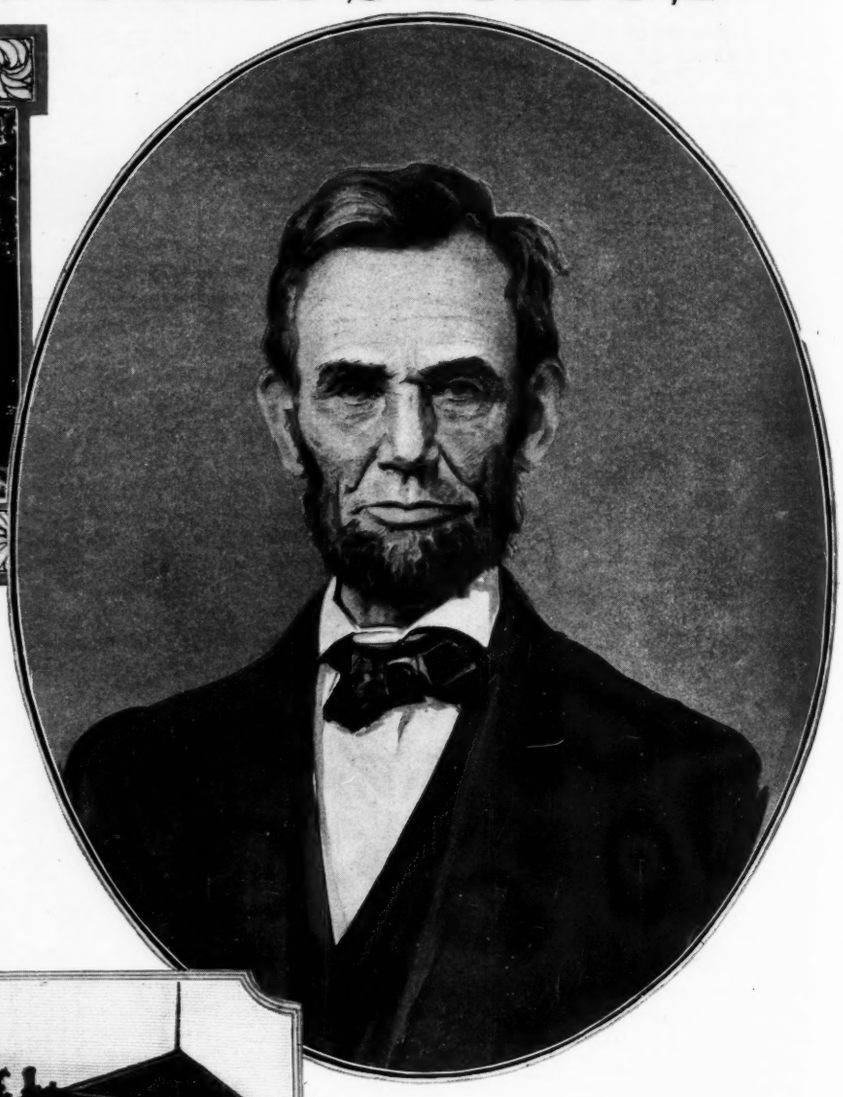
THERE'S need of good light and a table, too,
An ash tray, all in the den;
The wheels will be just what we want in there,
The motor will purr again,
When hitched to your sewing machine, perhaps,
Or grinding some sausage meat,
And the honk of the horn in the hallway, Ma,
Will start the scampering feet.

THE body is fine for a sleeping porch,
We mustn't forget the lamps,
To light up the path to the door at night,
When I'm on one of my tramps.
The waffles we'll cook on the radiator.
There is no reason or rhyme
In paying a thousand or more for a car
And not using it all the time.

Lincoln Milestones

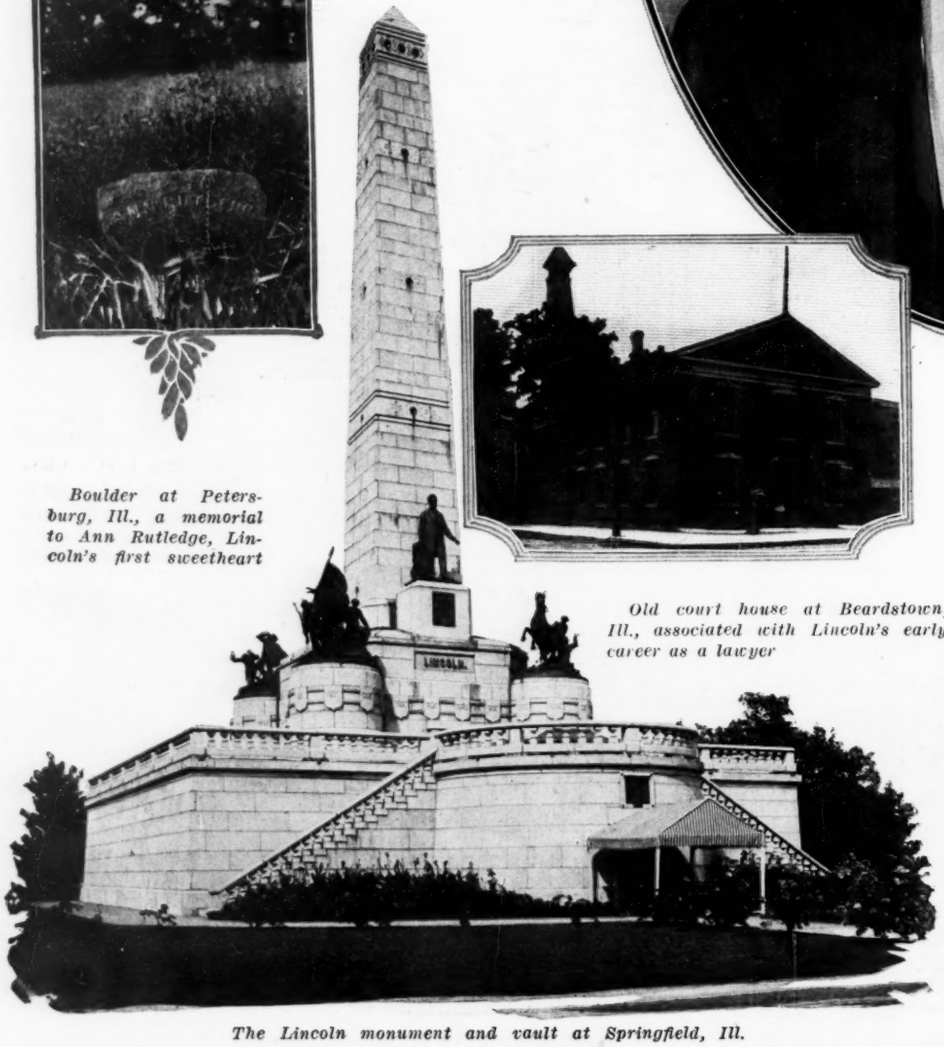


Lincoln's home at Springfield, Ill.



Boulder at Petersburg, Ill., a memorial to Ann Rutledge, Lincoln's first sweetheart

Old court house at Beardstown, Ill., associated with Lincoln's early career as a lawyer



The Lincoln monument and vault at Springfield, Ill.

WHEN we think of Abraham Lincoln, whose birthday we will celebrate on Saturday of this week, we associate two states, Kentucky and Illinois, and one city, Washington, D. C., with his illustrious name and quite naturally turn to them to supply memorials, erected or preserved to perpetuate his immortal fame.

It was in Kentucky that he spent his humble boyhood. Born in the Blue Grass state, he split rails on his father's farm by day, and at night read his Bible and John Bunyan's "Pilgrim's Progress" by the light of a log fire. And Kentucky has her memorials of Lincoln. By detouring at Hodgenville, the motorist touring on the Dixie highway may drive to the Lincoln Memorial farm and bare his head before the cabin in which the great civil war president was born and drink from the spring from which "Honest Abe" brought water for his mother. The log cabin now is protected from the ravages of time, having been rebuilt inside a memorial hall of marble.

on Memory's Highway

Although he was born in Kentucky, Illinois claims Lincoln as her son and can point to various places associated with Lincoln's life. In fact, among the historical attractions of the state, the most hallowed and visited are the home and monument of the great emancipator, located at the capital, Springfield. The former stands in the heart of the older section of the city, at the corner of Eighth and Jackson streets, and was the residence of Lincoln when he was practicing law and gaining fame as a statesman through his epochal debates with Stephen A. Douglas. It was in this house that Lincoln lived for 21 years and where he was notified of his election to the presidency in November, 1860. It is now the property of the state and filled with Lincoln heirlooms.

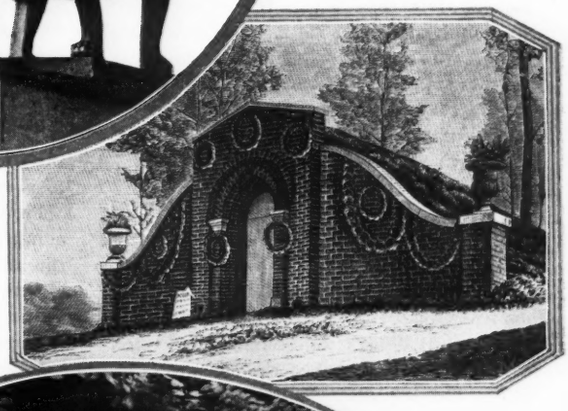
The Lincoln monument, where the remains of the martyred president are buried in a vault of steel and cement, 20 feet below the base of the towering shaft of marble, stands on the highest eminence in a natural park at Oak Ridge, north of the city. It was constructed about a half-century ago, but was entirely rebuilt in 1900-01 and has cost to date approximately $500,000. All the presidents of the United States since 1865, with the exception of Grover Cleveland, have visited it and written their names in the registers, which run back 44 years and contain millions of signatures.

In the Oak Ridge cemetery at Springfield also is the temporary vault where the bodies of Lincoln and his sons, Eddie and Willie, were placed in December, 1865, to remain there until 1871, when the caskets were taken to the monument.

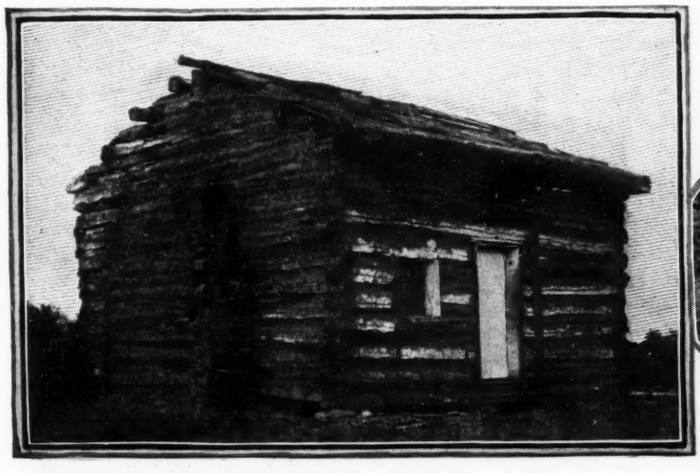
Situated on the southeast corner of the public square at Beardstown, Ill., located on the Burlington Way, is an ancient courthouse where Abraham Lincoln, attorney-at-law, won fame in the successful defense of an alleged murderer.

Lincoln memorial hall at the Lincoln farm, near Hodgenville, Ky.

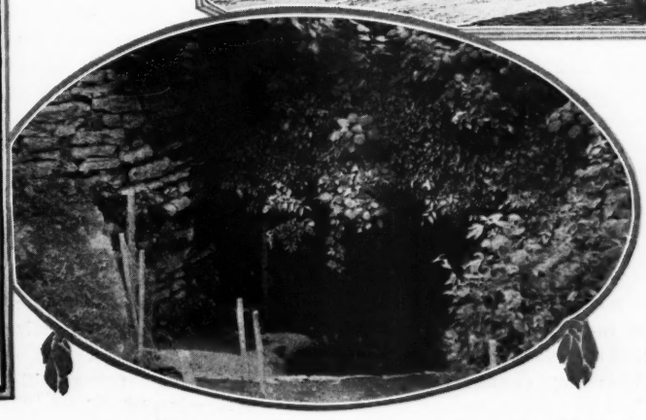
The famous statue of Lincoln by St. Gaudens in Lincoln park, Chicago



Vault in Oak Ridge cemetery, Springfield, Ill., where Lincoln's remains were placed after his assassination



The cabin in which Lincoln was born, now in the Lincoln Memorial Hall



The Lincoln spring on the Lincoln farm, near Hodgenville, Ky.

Uniformly Higher Prices for 1917 Cars Are Almost a Certainty

Increased Cost of Raw Materials Sure to Make Vehicles Dearer Is View of Market Experts—War Conditions Chief Reason

By Leslie V. Spencer

THAT all car manufacturers will have to raise the price of their machines for next year is practically a certainty, or, if they do not do this and hold the prices where they are they will have to cut the quality. This is the unanimous opinion of men who are closest to the present condition of the materials markets. In fact, there is no more important thing in the minds of motor car producers today than this question of price.

Three of the leading companies have now raised the selling figure, Cadillac and Packard having done so some months ago, and Chalmers falling in line recently, and the general feeling is that all must meet the situation fairly and acknowledge that they cannot continue at present figures when it is costing them about one-fifth more to build the vehicles than it did 1 year ago, solely because they have to pay much more for the raw materials. Therefore, it can be stated positively that unless some unforeseen and highly improbable easing-off of the demand for iron and steel, copper, zinc, aluminum, brass, bronze, tin, etc., takes place, the profit in the vehicles will not be sufficient to give a reasonable return on the money invested.

Supply and Demand

The whole situation primarily is a question of supply and demand. There is an over-demand for everything and this is immediately reflected in the price. Fortunate indeed is the far-sighted purchasing agent who looked ahead and contracted for his supplies well in advance, but there are a great number who did not anticipate the present condition and they are the ones who are left high and dry. Steel mills will not contract now for material for delivery before 6 months hence, and there are mills which are asking 10 months.

Heretofore it has been possible to secure contract material with 30 to 60 days at the longest. This will immediately make clear the predicament of the concern which is not well supplied with what it will need for another half year. Add this question of delivery to the problem of price and you make a combination which is serious for the big manufacturer as well as the little fellow.

Investigation has shown that only in very few cases have the manufacturers been able to take care of their prospective needs beyond January, 1917. They cannot even make contracts at present prices to extend farther ahead than that time because the steel mills will not entertain them. This may change as the year advances, but at present no one will venture to say what conditions will be when another 12 months roll around the calendar.

Apparently the car assembler is hit the hardest—much harder than the producer who makes the parts he puts into his chassis. The parts maker only gets materials as he contracts for his product, and hence he cannot buy material in large quantity very far ahead unless he is a very big parts maker and is able to figure on a general average from year to year. This condition immediately reflects on the price which the car builder has to pay, and any manufacturer today will say that he is paying more in proportion for everything he does not make in his own shops.

This means simply that the assembler cannot make as much profit today on a car which he sells at the same or even a slightly higher price than the actual car manufacturer, even though both cars were identical in quality and design. This statement would be discounted somewhat where the assembler works on a very large scale and is in a position to contract for what he is reasonably sure he will need many months hence. Very few are in that enviable position.

Some of the strong car makers will not feel the present great increases in price before next January because their contracts were made at lower figures to run until that time, but after that date none will say what he will have to pay. Therefore, with the announcement of 1917 models, which will begin about the middle of the year, if past policies are taken as a criterion, we will see increases all along the line unless some other way is found to surmount the situation.

Perhaps in some cases reduction of manufacturing cost can be made to offset the added cost of what goes into the cars, but this is very doubtful in view of the enormous increases. Then, too, the manufacturers, even though some of them are fixed until next January, will have to look ahead farther than that, because in most cases, they are simply getting nicely started on the new models by the first of the year.

For regular customers, the general advances in materials mean at the present time an increased cost of about 20 per cent on every car turned out, all other manufacturing cost factors remaining the same. This takes into account all materials with which the car is concerned. It figures in the aluminum, copper tubing, wiring, etc., etc.

To give a few specific instances of what this materials shortage—it can be called that—means, it might be said that the hot-rolled steel makers have increased their prices 75 per cent with the year. This takes in all sorts of bar stock, which is a very important part of the car man's needs. Normally, such material can be bought for $1.10 per hundred pounds, but at present it is quoted at $1.90 and delivery is far in the future.

But it is manufactured steel that is especially telling upon the industry. This is the stock that is re-rolled and made into frames, and countless other parts. Small strips of this kind have advanced from $2.40 per hundred to $3.50 and $4.00, and frame strips have gone up almost $1.00 a hundred.

One prominent manufacturer with an output of some 15,000 cars yearly figured it out for the writer that the frame alone used in his car costs $4.00 more than it did last year, and this advance is proportionate throughout.

Effect on Parts Makers

What has been said regarding car makers applies with equal force to the manufacturers of component parts for cars. Needless to say, they cannot take contracts with a certainty of delivery at any specified time, nor will they take any new business without raising the price to meet the new conditions, and perhaps even discount further advances to a large extent.

The parts people are especially hard hit in cases where they have long-time contracts to meet which were taken at prices based upon material costs far below present prices. Unless they were able to contract for what materials they needed, at prices in proportion to what they are getting for their products, they are simply taking the loss out of their expected profit. In many instances the parts concerns under contract have been to the manufacturers with the matter, but the car maker's answer is that he is in the same boat, and naturally looks to the parts man for what he has planned.

This condition was well illustrated by a carbureter maker of Detroit. He buys $12,000 worth of brass casting monthly and the cost has risen from 20 to 27 cents a pound, with an expected advance to 35 cents. He further uses $2,000 worth of brass rod each month, and on that the price has gone from 13 cents normally to 35 cents. Besides this, deliveries cannot be secured within 4 to 5 months, whereas in the past he has been accustomed to get what he wanted within 2 to 3 weeks.

"But I cannot go to the car maker and ask for more money," he explained, "because the car maker with whom I have a contract will laugh at me and say he is in the same boat himself."

As a result, this carbureter producer is like all others—he is trying to reduce the weight of his instruments by redesigning and shaving here and there without impairing the design. Necessity is dictating great things in the carbureter field, as in most others, for in another great carbureter plant in Detroit they are daily turning out 500 carbureters made of malleable iron, instead of brass, because the former is a cheaper material and seems to work equally as well. Some of the makers are even striving to so build their carbureters that some parts can be made of pressed steel, thus reducing the cost.

Position of the Industry

So it goes down through the industry. You will see axle makers scratching their heads over problems of weight reduction; see them substituting certain constructions for others where they can save in material cost without hurting quality; you will see this thought uppermost in the minds of a great many engineers.

You will hear people say that the industry should assert itself with the iron and steel makers, the aluminum producers and the rest. The industry takes such a large proportion of these products, they say, that it should be able to demand deliveries when it wants them; in a word, it should by its united strength be able to bring the materials people down on their knees and bring about reasonable service.

Nothing could be more absurd. The combined tonnage of iron and steel used by the motor car industry is not over 5 per cent of the total production of the iron and steel industry of this country. Why should the iron and steel industry, then, have any particular regard for the motor car industry? The railroads, the structural steel users and the bridge builders are the big consumers and their demands must come ahead of the car makers. This fact is recognized by a great many of the motor car men.

The total consumption of steel last year by the motor car industry was not over 1,500,000 tons, whereas the production estimated for 1915 was about 31,000,000 tons. One has but to figure it out to see where the motor car industry inevitably must stand in the eyes of the greatest of American industries—iron and steel.

By careful estimate, it was found that one car maker with an output ranking very close to the top, utilized about 10,000 tons per year.

Today it is said that certain of the munitions makers are offering a premium of 2½ cents and more, per pound, for preferred rollings, this over the present market. Think of that point along with the meagre percentage of 5, and you will wonder why the motor car industry is treated as well as it is right now.

An important result of present material conditions and the future outlook is that designers are paying closer attention to weight reduction and better working out of the details of their cars so that every pound of useless weight can be eliminated.

There is also chance for capitalization upon the situation. Supposing a maker has bought farsightedly and advantageously. He can raise price with the present market conditions as an excuse, and thus increase revenue with no added production cost, for the length of his contracts, at least. This, it would seem, he has a perfect right to do, and it is a reward for his buying shrewdness.

One thing seems certain. The makers should tell the public plainly how things stand and frankly meet the issue. Prices logically should be increased if quality is to be maintained, and it is the writer's opinion that the public would rather pay slightly more for the cars than to pay the same or less money for cheapened machines.

ALUMINUM SHORTAGE CAUSES HALT

Manitowoc, Wis., Feb. 5—The first important instance of the effect of the rapidly diminishing supply of aluminum was the necessity encountered by the Manitowoc, Wis., foundry of the Aluminum Castings Co., of closing down the plant for several days to await the arrival of new stocks of raw material. The Manitowoc foundry, like all divisions of the Aluminum Castings Co., has been working at full speed for several months to fill orders, principally for motor castings and parts. The supply of raw material has gradually been diminishing and the available supply advancing sharply in price. The company is assured of ample stocks for its requirements, but has met with some difficulty in getting prompt deliveries. The delay caused by the temporary cessation of work has been made up and deliveries of castings are going forward according to schedule.

PLAN EXTENSION OF HIGHWAY

St. Joseph, Feb. 4—Much enthusiasm and large attendance marked the third annual convention at St. Joseph, on Feb. 2, of the Pike's Peak Ocean-to-Ocean Highway Association. Transcontinental travel during the year 1915 demonstrated certain logical advantages for this route and it is recognized as one of the main highways across the country from east to west. The association now has its own definite organization between Indianapolis, Ind., and Salt Lake City, Utah. The time has come to extend the organization to the Atlantic and the Pacific coasts. Reports were read from committees which have been at work during the past year making investigations of the best roads east of Indianapolis and west of Salt Lake City.

"Americans First" Idea Is Spreading

Rush for Citizenship Papers at Detroit

DETROIT, Mich., Feb. 7—A surprisingly large number of complimentary letters have been received by the Packard Motor Car Co. since it announced a week ago its new policy of Americans first. Several other manufacturing concerns in the industry and some in other lines of business already have adopted the Packard slogan and the movement is likely to spread.

Among the workers of the Packard organization, the announcement that only those who are Americans, or who have applied for their American citizenship papers, will be promoted, has met with general approval. Foremen stated to the higher officials that they have little doubt that most of those foreign-born workers who have not yet become Americans will take out their papers.

No one seemed to have taken the attitude of the company on the citizenship matter in any but a patriotic spirit and many of the once foreign, but now American, workers have, without the asking, talked the matter over with their countrymen and are helping to bring about the desired, or rather, the desirable condition for their fellow-workers.

At the office of the county clerk it was reported that a very large increase in the applications for first citizenship papers was noticeable all of last week, and it is thought to be due to the Packard decision. Several other big concerns endorse the innovation of the Packard company.

Vim Adopts Anti-Hyphen Scheme

Philadelphia, Pa., Feb. 4—The Vim Motor Truck Co., this city, has given notice that the Packard anti-hyphen scheme would be put into effect immediately in its plant. It has given notice that it will not advance men who fail to take out naturalization papers and file them with a view of becoming citizens of this country.

OVERLAND SETS PRODUCTION

Toledo, O., Feb. 4—The Willys-Overland Co. on January 31 established a new shipping record, when 722 cars were sent out from its plant that day. During January, 1915, the total number of cars that left the factory amounted to 4,613, as compared with 12,393 for the same month this year.

A year ago the daily shipments from the Overland factory averaged 150 cars, or less than one-fourth of its present output. The manufacturing facilities have been increased in 1 year, so that it is now possible to build 1,000 cars every 24 hours.

The present floor space available for manufacturing purposes is 103 acres. This is fourteen times the size of the original plan when taken over by Mr. Willys 8 years ago.

The Why and How of Motor Car Spring Suspension

Advantages and Disadvantages of Various Types Outlined—How Flexibility is Combined with Strength

WHEN an old-fashioned carriage bumped its occupants over a rough road it was taken as a matter of course, and still is, but when a motor car, going four or five times as fast, gives an uncomfortable jolt once in a while, we ask what can be the matter with the springs, or the tires, or both. The demands of the public have grown exacting so rapidly that the art of springing a motor car scarcely has been able to keep pace with them, although this art is becoming more complicated and subtle every day as motoring grows.

Effect of Speed

Hitting the road obstacles at twice the speed of a horse vehicle, the motor of the same weight deals a blow—and receives it back—that is four times as powerful and destructive. The momentum is twice as great and works twice as rapidly. Going at 50 miles per hour, or five times as fast as a trotting horse, the car should be jolted twenty-five times as hard as the old-style vehicle. But, reality is not quite as bad as the simple theory in that case, because the pneumatic tires become very effective protectors at high speeds by allowing the obstacles to sink into them; but the jolts which are left for the springs nevertheless are very violent; probably at least fifteen times as severe on the structure as those a vehicle going 10 miles per hour receives under the same circumstances. If they do not jolt the occupants of the car in about the same proportion, it is because the springs in the car do better work than they did in the carriage of former days.

So peculiarly, however, is the combined effect of tires and improved springing that on ordinary roads—strictly excepting large potholes, deep ruts and large bumps or stones—a speed of 14 to 17 miles per hour tries the springs and bumps the occupants more than any other speed, either lower or higher. Unfortunately, this fact does not hold good when the road troubles are exceptional, of the kind just mentioned, as then the higher speed reasserts its destructive rights, but the record illustrates strikingly how hard it is to reason out in advance whether one kind of springs or another kind will prove superior in practice for any given type of car. To get the best results is an art rather than a science. It progresses gradually, ruled by increasing experience, happy hits and persevering tests.

As every other art, it has some data to work with, some knowledge about springs that is good to reason with and that is found applied more or less skillfully and carefully in every car. In all designing it comes ahead of the mathematical calculation of dimensions and of metallurgical details. This informal stock knowledge about springs shall be roughly dissected here, with omission of all that is subtle, intricate and uncertain. It all justifies itself, mechanically.

Partnership of Springs and Tires

One of the first basic facts is the partnership of springs and tires. If springs are very flexible, tires can be inflated harder and will last longer. Also, every spring works coöperatively with every other spring element above or below it; acting after it or before it in the transmission of a jolt. The two short and stiff springs of an elliptic are jointly equal in flexibility and working capacity to a long semi-elliptic that is considerably heavier. On this principle, applied in many ways, good builders manage to get the benefit of several spring actions between the road and the car occupants. The give of the frame, every soft or elastic washer, the torsion of a rod—all play their parts in the spring drama. Even front and rear springs work together, especially at starts and stops.

Caring for Rebound

One other basic fact stands out sharply; the business of springs is to reduce jolts and also to prevent large up-and-down or lateral movements of the carriage body. But, as movements are the means for reducing jolts, the capacity for movement below the car frame must be so much greater, and great capacity for movement means great flexibility of the springs.

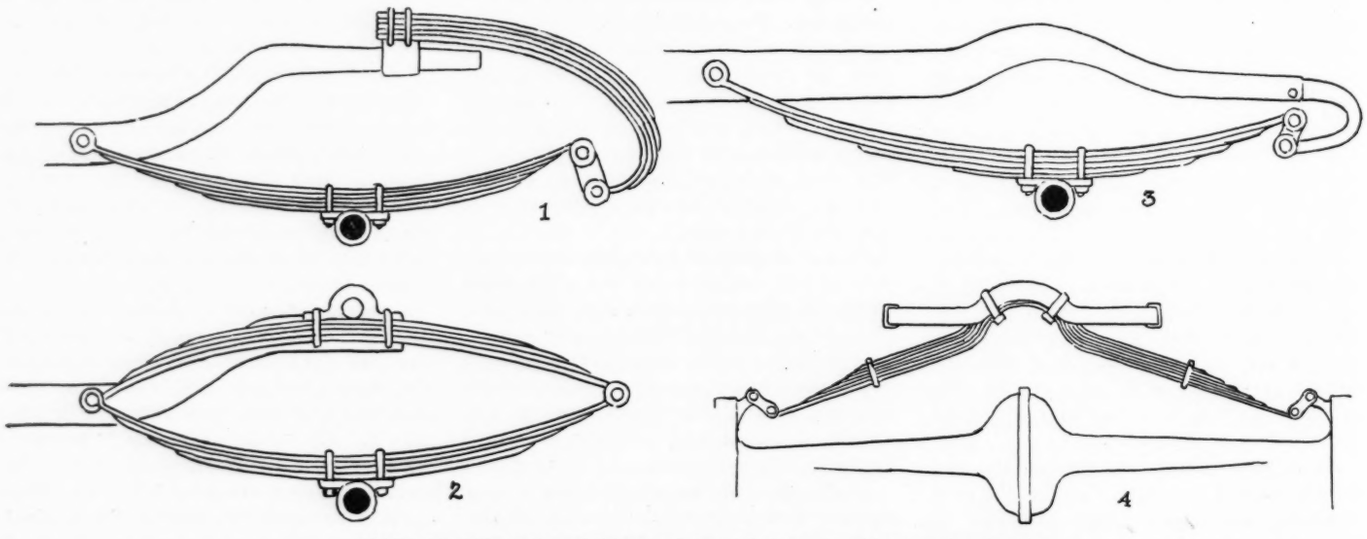
In this simple principle is found the reason why long and flexible springs, or equivalents for them, are the invariable equipment of fine cars, though everything possible must be done to prevent them from continuing to oscillate too long and working upward against the car frame at any moment when the wheels are on the ground, or the frame for any other reason is ready to be pushed upward without great resistance. An automatic brake action on the rebound of springs is, in one form or another, the means used. The whole philosophy of springing now is reduced to three factors:

1—Very flexible springs, to take small jolts easily and large jolts sufficiently.

2—Subdivision of springs to help in getting flexibility and to divide the large and instantaneous movement due to one sharp jolt into a succession of smaller movements.

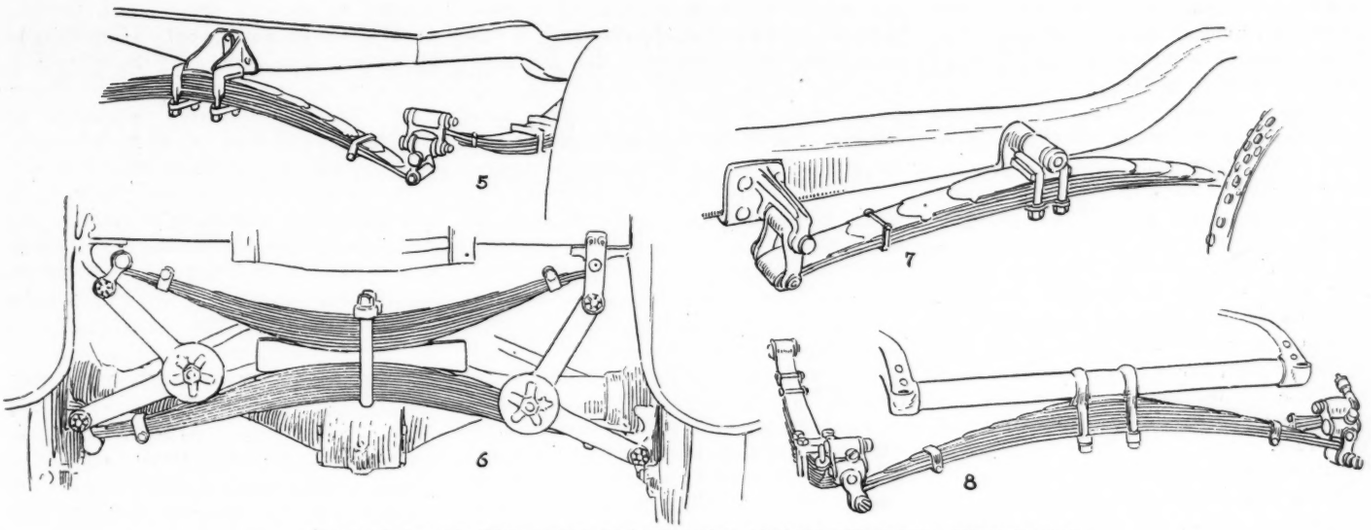
3—Automatic brake action on spring rebound to cut spring oscillation short.

A number of American manufacturers



SOME OF THE MORE USUAL TYPES OF REAR SPRING SUSPENSION

1, *Three-quarter elliptic;* 2, *elliptic or full elliptic;* 3, *semi-elliptic;* 4, *characteristic cross spring of Ford*



FOUR WAYS OF USING THE CANTILEVER ACTION FOR REAR SUSPENSION

5, Platform spring construction used on several expensive cars; 6, Marmon double cantilever cross spring; 7, single cantilever which is becoming popular; 8, Cadillac platform type

still prefer elliptic springs to semi-elliptics, and there is nothing to be said in favor of the latter except that they are more convenient for the builder, support the frame at two points, instead of one, and can be made flat, instead of curved. Being standard, they have had the benefit of the gradual development and can be supplemented more readily by other spring elements of the car's construction.

Types Compared

But the elliptic of equal flexibility takes up less space alongside of the frame and gives easier starts and stops, as it holds the axle more elastically by virtue of the single clip connecting it with the frame. The semi-elliptics, on the other hand, can more readily have their seats and clips on the axle so arranged that the spring leaves are not twisted when only one of the two wheels of a pair is thrown upward. It is usually done by having a large oval bushing between the axle and the clip. In default of such a provision, now common, the springs are much harder for a one-sided jolt than for one affecting both wheels.

Semi-elliptic springs at first were even more curved than one-half of a full-elliptic, but have been getting steadily flatter. At first, front springs were flattened, and the gooseneck of the frame bent lower to correspond, because in this manner a jolt does not conflict much with safe steering of the car. The flat springs were next found to be more sensitive to slight jolts and less so to sharp shocks, which naturally is an advantage. This property is due to the leaves rubbing least on each other, for a given degree of flexion, when they are nearly straight. But the principal virtue of the flat springs, causing them to be adopted for the rear, too, is their stout resistance to side pressures. In turning a corner, centrifugal force tends to make the car body roll over, pushing and twisting the spring on the outside of the turn, and the flat spring best resists this tendency.

When front springs are uniformly shorter and stiffer than rear springs, it may be mostly because reliable steering and large spring movements do not go well together, but it is also quite necessary to prevent the car body from pitching forward disagreeably when a short stop is made or when reaching the level after going downhill. At such moments the rear springs are momentarily relieved of a part of their load, and the frame rises at the rear while momentum pushes it ahead. Flat springs also resist this movement better than curved ones, and checks on the spring rebound assist them.

Obtaining Flexibility

The much-desired flexibility of springs can be obtained by making them weak, in which case they can be shorter and cheaper, and guarding them against the worst jolts by means of shock absorbers, which act on both the flexion and the rebound. This is done when a leaf or two are taken out of the original spring, in order to make a shock absorber work at its best. An objection to the method is that it makes the spring work too hard, flex too much and too often for the amount of spring steel in it. Experience must here be the sole guide. Further, the action of shock absorbers is not as constant and reliable as that of a good and ample spring, and sooner or later an emergency arises in which the absorber fails to protect, and the spring is broken.

Fine alloy steel scientifically treated affords the only fully acceptable means for combining flexibility and strength, or working capacity, in a spring of moderate length and weight. The great strength of the material means that a lesser amount of it will stand the hard work; its dense metallurgical structure and its perfect elasticity means that it will not suffer any "set" but will continue to hold up its load. Without alloy steel, really sufficient automobile springs would have to be long, heavy, clumsy; cumbersome to the builder.

Whether the leaves in a spring should be many and thin or fewer and thicker is a question which cannot be answered in general. The thin-leaved spring can be shorter for a given degree of flexibility, resists torsion better and, for a given length, oscillates more slowly, but it should have a double main leaf to resist rebound stresses and secure clips to hold the leaves together. The slow oscillation is usually considered an advantage, making the action more agreeable, but it is due to friction between the many leaves and can turn into sluggishness if rust enters. The somewhat longer spring of equal flexibility with fewer and thicker leaves can have its rate of natural oscillation regulated by means—damper or shock absorber—which are under better control and therefore more constant and reliable than the amount of friction between the leaves.

Cantilever Springs

One type blends into the other by infinite gradations—in the dimensions, at all events—and the right choice depends on technical niceties. For cantilever springs, the preference is for thick leaves, as the rocking action of this type of springs produces a movement which is an equivalent for great flexibility in the spring itself and its rate of oscillation is also slow enough for comfort, for reasons not too well known.

Cantilever springs are still in development and much discussed. Their introduction for large cars must be slow, because the wheel axle is half the length of the spring behind the point where the spring supports the car frame and body, and the questions of wheelbase, frame strength and the whole balancing of the car therefore must be determined by fresh design before the cantilever principle for the springs can be adopted. Their rocking action permits the wheels to slip over road obstacles without communicating much of the axle movement to the car frame, even if the flexibility of the spring is not very accurately suited to the load.

Inverted semi-elliptic springs have never been used at the sides of a car, but, when applied crosswise in front, taking the place of both front semi-elliptics, they give great freedom to the front wheels and axle. They are now used exceptionally at the rear and may become more general. It has been against the inverted semi-elliptic in this place that it puts the wheels and axle back at the end of the car body, but it is now shackled to the rear edge of the brake drum, and the axle can be 8 or 9 inches in front of it. It can easily be made flexible and yet strong enough, the whole car width being available for length, and each of its two members adding its flexibility to that of the other.

Auxiliary Coil Springs

When semi-elliptics are made short they usually are not of the finest spring steel and they are stiffer than they should be for comfort, to escape the chance of breakage. Auxiliary coil springs in that case are fitted at the rear ends. If they are stout enough to uphold the load—and they should be compressed in advance and held at a tension equal to the load—and yet more flexible than the leaf springs, they help greatly on stone pavements and similar surfaces, the coil spring oscillating rapidly enough to make the wheel follow this kind of small roughness.

Used in connection with a C-spring they illustrate the successive action of several spring elements to eke out a satisfactory flexibility in the total. There is the tire, the wheel—which may spring a little—there may be an elastic spring seat on the axle, then the semi-elliptic, the auxiliary coil, the scroll of the C, the C-spring proper, and the clip of the C-spring may have a slightly springy purchase on the car frame. Economy often figures out the whole combination too stiff, however, and rarely proof against set in one or more of the elements.

Platform Springs

In platform springs the cross member invariably is less flexible than the side members. They are blamed for causing rolling of the car body at turns, but much depends in this respect on the shackles connecting the members, the curvature of side members and the height of the load. Loose link shackles should not be used for speedy vehicles. Dimensions and details decide the action for one-sided jolts. On the whole, platform springs are generally well liked for heavy cars in which the load is well to the rear.

Light weight of the running gear of a car is much spoken of as affecting the comfort of the springing. What is meant is the proportionate weight compared with the weight supported on the springs. This subject is closely related to tire inflation and fabrics. Technical opinion on it is unsettled. But it is almost certain that, so far as comfort is concerned, the lightweight running gear is more nearly indispensable for very small and light cars than for heavy ones. It always serves tire economy.

Great Activity in Tractor Field

New Knox Design Operates Independently

SPRINGFIELD, Mass., Feb. 4—The Knox Motors Associates has produced an entirely new type of Knox tractor, although mechanically it is practically identical with the standard chassis. The new tractor is designed to operate as an independent unit, to haul four-wheeled trailers, and is equipped with a winch of exceptional power. The new product is called the Knox towing winch tractor and is intended, according to the Knox company, for special service, such as pulling loads of lumber up on to trailers, subsequently to be hauled by the tractor, for circus outfits, where the tractor may not only haul heavy loads of equipment, but with its winch assist in erecting the big tops. It is especially adapted to applications wherein the roads are unusually bad, so that with wheel traction alone the vehicle is apt to become mired, when the winch may be used to extricate it.

It has a very large sprag, which is intended to be dropped when the winch, which is placed on the rear deck, is in use. Between the cab and the winch there is a short body designed to carry a load up to 3 tons, to aid in securing traction. The usual Knox spring suspension is departed from, since the frame extends back as in an ordinary truck, and is suspended on half-elliptics.

The winch has a draft of 20,000 pounds and is driven by irreversible worm gears. Its speed at 1,000 r.p.m. of the engine is 40 feet per minute. There is 150 feet of cable on the drum. It may be operated either with the vehicle still or when it is in motion.

It may be equipped with either standard wood wheels and dual solid tires or with steel wheels with diagonal lugged treads. It is priced at $5,000, f. o. b. Springfield, Mass.

FORD TRACTORS COMPANY DISTINCT

Detroit, Mich., Feb. 4—When Henry Ford announced last year that he will build farm tractors it was generally thought that this business would naturally be a part of the business of the Ford Motor Co. Even after the firm of Henry Ford & Son was formed last year it was thought that the motor car company would have something to do with the tractor end of the business.

Not only will the Ford Motor Co. have nothing to do with this matter, but the stockholders of the company yesterday assigned and quit-claimed all interests and rights in the tractor business to Henry Ford. The manufacturing and selling of the tractor will thus be conducted exclusively by the firm of Henry Ford & Son.

At the plant in Dearborn, Mich., it is said that quite a number of tractors are still being made for testing and experimental purpose, and that the manufacturing for commercial purpose will not be started for quite a while.

WANTS STANDARD TRACTOR RATING

Washington, D. C., Feb. 4—The rapid progress in the development of the farm gas tractor and the constantly increasing number of men who are purchasing or contemplating the purchase of outfits in this country have led to a movement in the United States department of agriculture in favor of some standard rating of the power of such machines. The department recommends that until there is such a definite authoritative standard, buyers of tractors should pay more attention to the amount of work actually done under like conditions and with practically the same fuel consumption than to the catalogue ratings.

NEW TRACTOR COMPANY IN DETROIT

Detroit, Mich., Feb. 4—The Wolverine Detroit Tractor Co. is being formed here to manufacture a motor tractor which is to sell at from $800 to $900. The promotors of the company are W. G. Wagenhals, formerly vice-president of the Wagenhals Motor Co., who is the designer of the tractor, and W. J. McNamara, former mayor of Edmonton, Alberta, Canada, and reputed to be the owner of more than 20,000 acres of farm land in that section of Canada. Temporary offices have been opened at 664 Grand avenue.

WILL MAKE FARM TRACTORS

Kalamazoo, Mich., Feb. 4—A farm tractor, specially adaptable to the conditions of the soil in the middle west and to cost about $1,000, is to be made by the Reed Foundry and Machine Co. This was announced at the annual meeting of the company last week.

TEXAS LAW IS INTERPRETED

Dallas, Tex., Feb. 4—That a concern has not the right to restrict its agents to the sale of cars in a specified district in Texas is the ruling of the district court at Austin, where an injunction has been issued against the Olds Motor Works and the Cadillac Motor Car Co., restraining them from forcing their agents, Turner & Davis, the Houston Motor Car Co., and the Munger Automobile Co., to keep within a certain territory. Suit was filed 2 weeks ago by the attorney-general. No penalties were asked.

Packard War Trucks Are Equipped with Bumpers Behind

After 18 Months of Service Vehicles Are Changed Slightly According to Recommendations of European Army Experts

DETROIT, Mich., Feb. 2—While the Packard trucks which were sent to France at the beginning of the European war have given satisfaction to the military authorities there have been several changes made, following suggestions of the French army engineers, which bring the trucks more up to the special purpose for which they are to be used.

The principal new feature of these trucks is that they have a special angle-iron radiator guard at the front end and an angle-iron bar, cushioned on heavy springs, serves as a bumper on the rear end of the frame. This construction was provided to overcome as much as possible the rough service which the trucks undergo in military service.

This truck is of the three-ton chainless type. It has a 13-foot wheelbase and a 12-foot frame back of the driver's seat. The body is a special box model built to specifications furnished by the French army engineers and is equipped with seven heavy bows and waterproof tarpaulin cover. Another tarpaulin, which fastens to the dash and forward bow of the top, specially protects the driver in inclement weather. The equipment includes acetylene gas tank and headlights, special tool and spare part boxes and hub odometer.

NEW ALCOHOL FOR GERMAN MOTORS

New York, Feb. 4—Baron von Low, of Germany, is said to have discovered a new alcohol for motors with a specific gravity of from 90 to 95. It is claimed that the best possible results are obtained by mixing this spirit either with benzol or gasoline in the proportion of 1 in 4 or 1 in 5, in warm weather of even 1 in 6. Only a very slight adjustment is necessary to the carbureter. It is claimed that one Mannheim firm will eventually be in a position to produce 118,890,000 gallons per annum, which will be more than the present requirement for motor cars in Germany.

MOTOR PARTS CONTRABAND

Washington, D. C., Feb. 8—According to a proclamation of January 27 the British government has made several changes on its lists of absolute contraband, among them being in regard to item 26, motor vehicles, etc., shall be added after the word, parts, the words, and accessories.

PROHIBITS RUBBER EXPORTS

The Hague, Feb. 4—The exportation of rubber from Holland was prohibited by royal decree last week. It is understood that as this measure will cut off exports to Germany, Great Britain will order no further interference with shipments of rubber to Holland. In the past, rubber cargoes have been held up until it was proved conclusively that they were not consigned to German agents in Holland.

CARS AT BRITISH EMPIRE FAIR

London, Eng., Feb. 1—Plans are being made for a British Empire Fair to be held next year. An exhibition building which, it is said, will be the largest of the kind in the world, will be erected at Willesden Green, in the spring of 1917. A new building will be erected and will be designed to provide accommodation for exhibits from almost every known industry. It will continue 3 weeks. Among the list of products that will be shown are motor cars and trucks.

DORT INVADES ENGLAND

Flint, Mich., Feb. 7—Dort cars will be distributed in England by Whiting's Ltd. This marks the first step of the Dort company to invade foreign territory. Arrangements have been made, however, to more than double the present factory production.

SUNDAY WORK IN BAY STATE

Boston, Mass., Feb. 5—The Massachusetts legislature this week passed the bill to allow motor dealers and garage men to sell supplies like oil, gasoline, tires, etc., and to do necessary repair work on Sundays. Under the law as it stood, it was illegal to make any repairs or sales Sundays and a Springfield judge convicted a garage man for doing it, warning him and others in that city to refuse to sell anything in future. Governor McCall will sign the bill undoubtedly, and it will become a law at once.

ORGANIZE TRUCK EXCHANGE

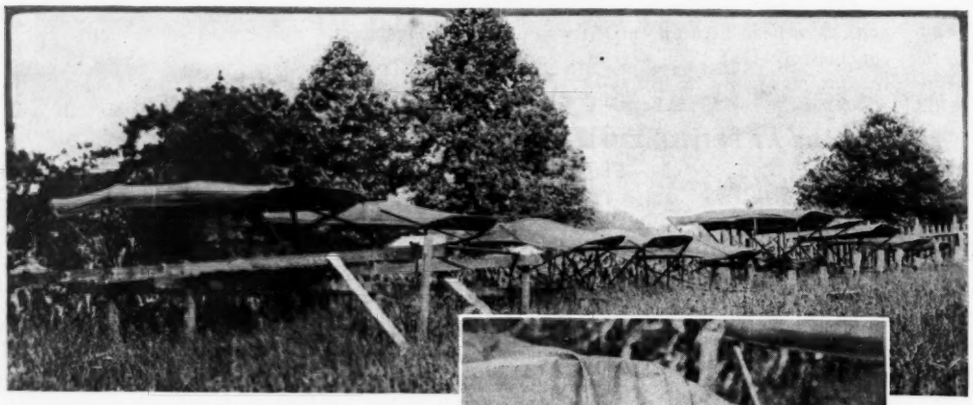
Los Angeles, Cal., Feb. 4—Owners of heavy-duty motor trucks of Los Angeles have organized the Truck Owners' Exchange. Dealers selling heavy duty and dump trucks as well as representatives of the larger tire concerns, were present at the meeting of the truck owners and assured the operators of their hearty support. The object of the organization is to bring the owners, dealers and contractors into closer relationship. The exchange is to be operated along the lines of any retail dealers' association and is to join the Merchants' and Manufacturers' Association.

Many owners of dump trucks have worked on state and county highways and have not as yet been paid for work completed more than 2 months ago. The engineers have not put through the vouchers and the owners have now organized to handle this and other important matters and to be able to meet other issues in this territory. There are almost $1,000,000 worth of dump trucks operated in and around Los Angeles and this organization will play a prominent part in the truck industry is the general belief.

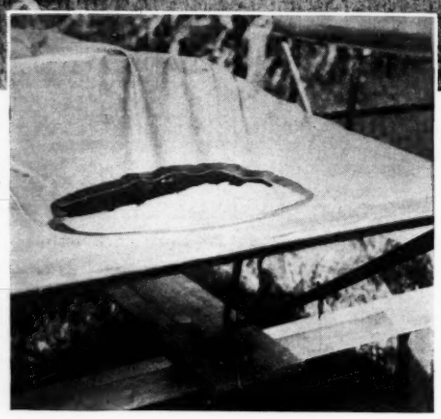
New Packard war truck designed from recommendations of European army experts. Note the bumper at rear and heavy guard at front

Strenuous Tests for Fabric Upholstery and Top Materials

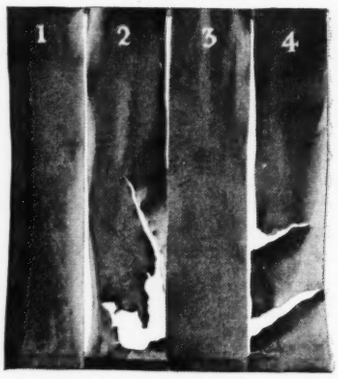
How Fabrikoid Is Made in the Du Pont Factory—An All-Year Trial Is Staged



These tops, of various manufacture, were tested by the Du Pont company for a year mounted on frames in an open field where they were exposed to all sorts of weather and being frequently opened and closed—more frequently than would be the case if they were mounted on cars in active service. As a result of this test it was decided to put Raynite, the Fabrikoid top material, on the market with a guarantee against leakage for a year. Water was allowed to collect and stand in the tops for long periods to test their waterproof qualities as shown below



During the year that the top materials were under test at the Du Pont plant, the frames were frequently loosened and water allowed to collect and stand for weeks and months at a time to test their waterproof qualities



Results of 8-hour test for surface durability of Fabrikoid and split leather. No. 1 is black Fabrikoid and No. 4 is black split leather. No. 2 is Spanish leather and No. 3 is Fabrikoid in a Spanish finish. The test was made on the machine illustrated on the opposite page

IT often has been remarked that whenever the natural supply of an indispensable commodity decreases, or the demand for it increases to a degree which threatens to embarrass the industries affected, the ingenuity of man rises to meet the emergency. The uses to which leather customarily is put have increased enormously in recent years, no more striking illustration of the multiplication of demand being presented than the rapid growth of the quantities required for upholstering motor cars. Added to this and the widening of the other fields in which leather is largely used comes the great demand from abroad due to the European war.

Reason for Fabrikoid

Then, too, the supply is not increasing in proportion to the heightened demand, while prices resultant upon these conditions make it very difficult, if not impossible, for the manufacturer of the popular-priced cars to use the best quality leather, usually referred to as No. 1 machine-buffed leather, which is conceded to be the best possible material for this purpose. To meet the demand thus created, the Du Pont Fabrikoid Co., Wilmington, Del., after 2 years' work, developed, about 1912, a grade of its product, Fabrikoid, suitable for upholstering motor cars.

This material, the company claims, is superior in finish and durability to the so-called "splits," or sublayers of leather usually employed for motor car upholstery in default of the No. 1 machine-buffed grade, while it compares favorably in price with any of them. Moreover, the Du Pont company regards its type of upholstery material as the logical solution of the upholstery problem, the difficulty of which is enhanced by the low car prices due to keen competition.

Another feature of the situation is the great increase in the demand for leather in manufacturing articles for which the Fabrikoid type of material is unsuitable. The Du Pont company estimates that 75 per cent of the cars on the American market for 1916 use upholstery of this type, of which 60 per cent will be Fabrikoid, stating that this is one of the improvements in efficiency and economy which made possible the low prices characterizing the majority, as compared with previous years. Over 70 per cent of the 1915 cars were fitted with this type of upholstery, of which 40 per cent was Fabrikoid, according to the same authority.

A prominent factor in the economy attending its use is said to be the small percentage of waste in cutting, as compared with leather. Since Fabrikoid of the grade used for motor car upholstery is shipped from the factory on rollers carrying rolls of material 60 yards long and 50 inches wide, the waste is minimized in handling, whereas the irregular shape of a hide renders it practically impossible to avoid a waste in cutting of 25 to 33⅓ per cent.

Fabrikoid is made of moleskin, a very fine, closely-woven grade of cotton cloth, over which is spread, under pressure, a coating of soluble cotton mixed with mineral coloring pigment and other ingredients imparting the qualities of pliability, toughness and elasticity. The first coats are very thin to insure anchoring the jelly to the cloth filaments. The resulting product goes to the embossing machine, where it is given the desired grain by electroplates of real grain leather.

The more popular grains are embossed by the use of rollers, this method facilitating quantity production, while the other varieties, which are made in smaller lots, are taken from plates, the latter being easily changed and less expensive than the rollers. Castor oil is one of the ingredients used in the jelly coating, the latter being practically the same as that used for coating the split leather used for upholstery work.

The quality of the goods is determined by the number of ounces of coating solution applied per square inch, while the grade of cloth used depends on the tensile strength required. Prior to the development of the wide demand for materials of the Fabrikoid type, it was impossible to obtain the cloth used in their manufacture from American weavers, but more recently looms of the type required for its making have been constructed so that there is now no difficulty in securing it.

Material Is Waterproof

Besides the qualities of pliability, toughness and elasticity mentioned, Fabrikoid is waterproof, easily washed with soap and water, not affected by extremes of temperature, and oil or gasoline cannot stain it. Another advantage, as compared with split leather, is pointed out by its manufacturers to be its uniform strength and thickness throughout.

Motor Quality Fabrikoid, as the grade

for motor car upholstery is called, is made in plain black grain, the Du Pont company stating that its tensile strength is indicated by the fact that it has withstood a tensile strength test of 350 to 400 pounds per square inch, whereas a piece of split leather broke at 157 pounds. The method of making this test and its results are shown in the accompanying illustration on this page.

A folded strip of Fabrikoid and a similar strip of split leather were secured to the two scale beams illustrated and to the lower end of each was attached a pail of sand. The Fabrikoid remained intact at 350 pounds pull, while the split leather broke at 157 pounds. Another test made on the same machine to determine the relative strength and durability of Fabrikoid and split leather consisted in a continuous whipping of parallel strips of these materials held by the horizontal frame, as illustrated, the whipping means being beaters like sewing machine belting attached to the revolving rack driven by belt from the electric motor.

Ability of Fabrikoid to withstand severe surface abrasion was clearly demonstrated, the only effect after 8 hours' whipping being a slight stretch, whereas the similar strip of split leather stretched badly and broke after 3½ hours.

The DuPont people state that motor

Machine for testing tensile strength and surface durability of leather, etc. A strip of Fabrikoid suspends the pail at the left which contains 350 pounds of sand. The strip of split leather suspending the pail at the right broke at 157 pound pull. The beaters attached to the rack revolved by belt from the electric motor play on parallel horizontal strips of Fabrikoid and split leather. The result of this test is shown in another illustration

quality Fabrikoid has been used for 2 years by several of the largest producers of cars in the country on several hundred thousand cars. During that period, they say, there has been only one complaint, a defective piece of goods being found on the driver's seat of a single car.

Associated with Fabrikoid is the material made by the DuPont company for tops. This is called Rayntite and it is manufactured in both single and double textures. Single-texture Rayntite is a Fabrikoid and is waterproof, sharing the other properties of that material as well. The double-texture material is Fabrikoid combined with a cloth backing.

Before Rayntite was put on the market it was tested for a year in competition with top materials of other manufacture, the tops being mounted side by side in an open field, as shown in the accompanying illustration, where they were exposed to all sorts of weather. They were opened and shut frequently, in fact more than would be the case if they had been mounted on cars during the year of the test.

The other illustration shows how the tops were left loose on the frames, so that water might accumulate on them and test their waterproof qualities when subjected to this condition for weeks and months at a time. The DuPont company's business for 1915 was almost double that of 1914, due chiefly to the increase in sales of Fabrikoid and Rayntite materials to car manufacturers.

Manufacture of Lampblack Assumes a New Importance

Black-Tread Tires' Popularity Cause of Demand for By-Product

CHICAGO, Feb. 4—Since black tires have entered the field, and since black rubber is achieved only by the use of old-fashioned lampblack, another industry has come to the front. Formerly lampblack was used only to color paints, polishes and the like. The average paint manufacturer made his own. But since rubber manufacturers have been purchasing large quantities of it to use in coloring tires, a great, new market has opened up, and lampblack is made on a much larger scale than formerly.

Lampblack, chemically, is pure carbon, though somewhat different in its appearance and effect upon surroundings than the diamond, which is also pure carbon in another form. Formerly there were nearly a dozen kinds of lampblack; ivory lampblack, made by burning ivory, and other varieties made by burning vegetable or animal oils. Any oily refuse, burned to complete combusition, made lampblack as one product.

Now there are practically only two kinds—gas and oil lampblack, made by burning natural gas or petroleum oil, and the process, strangely enough, is just the same in principle as the old one that gave lampblack its name, because it was deposited on lamp chimneys when lamps burned smokily. The West Virginia and Oklahoma oil fields produce most of the country's lampblack now, although, it is expected, other sources will appear.

There are two general processes. In one, the oil or gas flame is directed from below against the outside of a revolving steel cylinder. The lampblack is deposited on the cylinder, and scraped off by a scraper as the cylinder goes round. In the other the flame is directed into series of connecting brick compartments. Some lampblack is deposited on the walls of the first compartment; a finer and fluffier grade in the next compartment as the air carries it along, and so on to the end.

Some difficulty is experienced in rubber factories in handling this coloring material. It is so light and fluffy that unless the greatest care is taken it spreads over everything accessible and the workers in it resemble real Ethiopians most of the time. The demand for lampblack for coloring tires has advanced its market price 40 per cent in a comparatively short time, and it is safe to say that no one could now go on the market and buy the industry's requirements for the next year. It simply isn't made fast enough.

MOTORISTS BUY PARKING SPACE

Atlanta, Ga., Feb. 4—The passage of certain amendments to the traffic ordinances which forbid the parking of cars in certain sections of the business districts has made vacant property in the congested districts valuable. Merchants and professional men who formerly went to their stores and offices in their cars, leaving the machines on the streets while they were not in use, together with shoppers who make their buying tours in cars, are seeking places at which they may leave their vehicles.

A number of pieces of vacant property in close proximity to the office buildings and the retail districts have been developed as parking places. Here guards watch over cars which are left on the land and the owners of the machines are charged a nominal sum for every hour that the cars stay on the property.

Small lots in the rear of business buildings which formerly served as homes of the garbage cans and storage yards for crates and cartons now are crowded with every kind of car from the most dilapitated roadster to the finest limousine.

HUGHEY TO SELL PEERLESS

Chicago, Feb. 7—William J. Hughey, a designer of special bodies for motor cars for the last 25 years, has taken the Peerless agency. By an arrangement just consummated with John R. Buck, of the Pearson-Buck Motors Co., Mr. Hughey becomes president of the Hughey Motor Car Co.

Vesta Centrifugal Electric Clutch Smoothes Action of Car

Account of Demonstration Drive in Vehicle Equipped with New Morrison Transmission System

By Darwin S. Hatch

CHICAGO, Feb. 4—It is not unusual that new designs and constructions which seem to offer much when viewed on paper fail in an actual trial of the concrete installation to live up to the expectations aroused by a study of their plans. Constructional difficulties sometimes make it impossible to get expected results by the practical application of a beautiful theory.

Hence, it is a pleasure to record the results of a drive in a car equipped with the new Vesta centrifugal electric clutch which was described in Motor Age for January 27, and whose design promised a number of advantages over conventional transmission systems in the way of easier control and smoother running. Actual handling of the car equipped with the new system proved a revelation as to what extent it is possible to convert the irregular impulses of the gasoline engine into smooth, even torque at the rear wheels.

To recall the features of the design, which was explained in detail in the earlier issue, the Vesta centrifugal electric generating clutch is a combined motor generator which replaces the flywheel, clutch, lighting generator and starting motor of the conventional car. There is an electrically-operated gearset which offers two or three reductions for emergency use, but under ordinary conditions, starting and running of the car are on direct drive.

Feature of System

The idea of the new design is the utilization of a combination of the electromagnetic drag between the armature and fields of any electrical machine with a direct friction connection, such as is obtained in the ordinary clutch. The armature of the instrument constitutes the flywheel of the engine and the field is mounted on the forward end of the propeller shaft with a unique constant-mesh gearset between it and the propeller shaft. The fields are within the armature, so that the commutator is internal and the brushes, which revolve with the propeller shaft, press outwardly against the commutator. They are mounted in such a way that centrifugal force of their rotation increases the force with which they press against the commutator.

On picking up speed, or whenever the resistance of the rear wheels is too great for the centrifugal force to prevent slippage between brushes and commutator, the fields will start to revolve less rapidly than the armature and this difference in speed causes a current to be generated in the armature. This current flows around the field poles, making magnets of them, the magnetic drag thus caused drawing the field around with the armature. The greater the slip, the greater the magnetic pull. The excess current produced by variation in speed between armature and field above that required by the field, goes to keep the battery charged. No current for the operation of the clutch is taken from the battery except when the clutch is operated as a motor to crank the engine.

Sensation Like Canoeing

In view of the fact that there is no mechanical connection between engine and flywheel at low speeds, it is to be expected that the action of the car would be exceedingly smooth and such proved to be the case. The sensation can be compared best to that of canoeing in calm water. Even when starting with a cold motor, which missed and bucked as cold motors are wont to do, only the sound of the irregular explosions apprised us of the fact that the engine was not working smoothly. So far as the propulsion of the car was concerned, we might have had twelve cylinders under the bonnet instead of intermittent three and four.

The first view of a car equipped with the new system did not indicate much out of the ordinary. There was a slightly larger battery than usual. Also on the running-board there was a small metal box, which later was found to be the switch unit. The steering column offered the most to be seen. Under the steering wheel was a metal box, from whose sides protruded four large buttons, about half the size of doorknobs. There was neither gearshift or emergency brake lever. Otherwise the car was normal.

The handling of the car was very simple and easy, an overgrown button in the form of a knob was pulled out and the engine started. A second, or neutral button, was pulled, which left the car ready to be started. Then we stepped on the accelerator and the car started on high, picking up in speed as the throttle was opened—and accelerating with surprising rapidity, the more surprising considering the small four-cylinder engine and a rather heavy car. The electrical mechanism operates automatically with the throttle.

After reaching a speed of 20 miles an hour the neutral button was pushed in, which broke all electrical connections in the car. It was then demonstrated that the centrifugal force was sufficient to drive the car as well pick up to any higher speed as desired. This is done without the aid of any electric or magnetic connection.

Then we tried to stall the engine. With a foot on either brake pedal and still on high speed, we brought the vehicle to a dead stop, and still the engine kept running, even with the throttle fairly well closed.

Running at 25 miles an hour on high, we pulled another knob, and without the slightest sensation of a jerk we were in low, the only evidence of the change being the slight click of the solenoid switch and the increased motor speed. There was no careful slowing down, holding out of clutch, shifting a lever, accompanied by grinding of gears, speeding up the engine, letting in the clutch, etc., that usually is necessary in dropping from high to a lower speed with the conventional transmissions—we simply pulled a knob on the steering column and that was all. The gearset is operated electrically by knobs on the control box mounted on the steering column. Also it is of the constant-mesh type, so the gears are not slid into mesh; consequently, there is no clashing or grinding of the gears.

Knobby Control

We pushed in the low-speed knob and were immediately in high without knowing a change had been made. With all the knobs in there is no clutching action, so that this corresponds to neutral in the conventional car. Then we pulled out another knob and were in reverse, and had just as many speeds backward as forward, and ran just as smoothly.

Threading the city's traffic at a time when the homeward-bound motorists and pedestrians and the long lines of street cars offer the severest test of a car's handling qualities, we negotiated the streets at a snail's pace, stopped and started again in obedience to the policeman's whistle, and did it all on high. Also we did it with the smoothness and ease of an electric.

In just what way the Vesta Accumulator Co. will market the new device is not fully determined as yet. Officials express the intention to license the Morrison patents to car builders. In addition, it is expected that the Vesta people will be building a car before the middle of summer, which will have the new system as its feature.

MICHIGAN TAX LAW UPHELD

Detroit, Mich., Feb. 8—Special telegram—The circuit court of Wawne county today decided that the new Michigan motor car tax law is constitutional. The decision will be appealed to the supreme court by the city.

Free Parking Service for Chicago's Electric Shoppers

Manufacturers and Garagemen of Battery Vehicles Provide Space and Messengers in Grant Park for Loop Visitors

TO be one's own driver to the shopping and theater district, to turn the car over to a uniformed attendant at a fashionable shop, to have it taken to a municipal parking space by a licensed chauffeur, and to have it delivered to that shop at the hour desired is becoming quite the vogue among women owners of electrics in Chicago.

Through a service installed conjointly by the electric garagemen in Chicago and the manufacturers of electric cars, owners of the battery-driven vehicles in the Windy City can use their cars in going to and from the loop section of the city for business, shopping or the theater without the inconvenience and annoyance occasioned by the 30-minute parking rule.

Business District Restricted

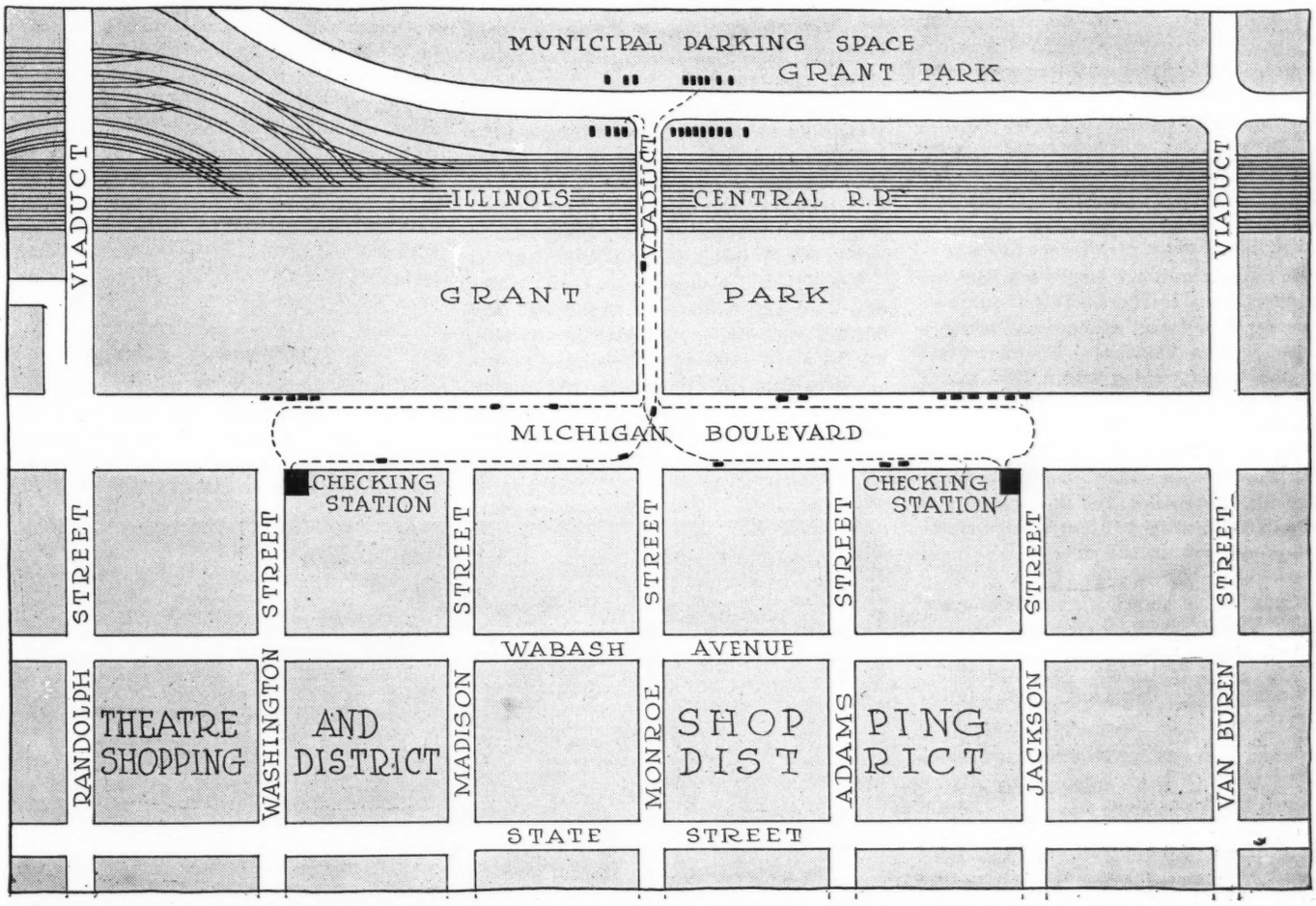
The heart of Chicago's business district is constricted by the steel band of the elevated railway loop, which encircles an area of about ½ square mile. The congested condition of the streets within the Loop is such that it has become necessary to enforce rigidly the traffic regulations prohibiting a car standing more than ½ hour. Later, provisions were made for a municipal parking space in Grant Park on the lake front, but as this is some distance from a considerable portion of the theater and shopping district, it is not utilized to the extent it would be if it were more centrally located.

The rule had an immediate effect upon the use of electrics in the city, as these were employed chiefly by women who did not care to take the not-too-pleasant walk over a railroad viaduct from the parking space in Grant park. Naturally, the 30-minute period is too short for theater or shopping trips for persons of that class who would not care to shop on a short-time schedule or evade the law by returning frequently and relocating their cars.

The downtown electric parking service idea had its inception as a remedy for existing conditions and to give the electric passenger vehicle the distinction of possessing a service which is not available to any other type of car. The proprietor of the Fashion garage, an electric service station, instituted the service exclusively for his patrons during the holidays a year ago and later started a successful permanent service. The matter of expense was prohibitive for other and smaller garages, so the Chicago section of the Electric Vehicle Association started a similar service last July with headquarters at the electric shop of the Commonwealth Edison Co. Fourteen electric garages in the city and three manufacturers of electric cars combined to pay the operating expense of the service, the charge being based on the relative number of patrons using it. No charge is made to the patrons for the service.

How It Operates

The operation of the service is as follows: Patrons leave their cars at the service station on Michigan avenue and receive a key tag. The car then is driven to the municipal parking space by a liveried chauffeur, a special space being set aside for the electrics. At the hour specified by the patron, the car is returned to the checking station.



How the downtown electric parking service has been operated in Chicago. This shows the two checking stations, each near the center of the northern or southern half of the downtown portion of Michigan avenue, and their relation to the theater and shopping districts. It also shows the route of the electrics to the municipal parking spaces on the lake front as taken by the chauffeurs provided. The southern checking station temporarily has been superseded by one more to the north

As the service became more popular, a second checking station became necessary, so in addition to the one at the electric shop there was installed a second one at Jevne & Co.'s, a fancy grocer on the avenue. Recently, the service at the electric shop has been moved to another fancy grocer on Michigan avenue.

The expense of the system is not great, the merchants donating the space for the small deskroom required and being more than repaid by the number and class of patrons it brings into the store. Only two chauffeurs are required, as they have very short runs from station to parking space.

The service is not as widely used as it will be this summer, but the stations now are handling between 140 and 160 a week —last week's figure was 154 cars. Much of the success of the service as it has been operated by the local branch of the E. V. A. is due to the efforts of F. E. McCall, secretary of the Chicago section of that association.

Kansan Wins Hyatt Bearing Contest

Drives Buick 261,800 Miles on One Set

DETROIT, Mich., Feb. 4—F. E. Slason, Plainville, Kan., has been awarded the first prize, $500, by the Hyatt Roller Bearing Co., in its mileage contest among car owners to find the one whose automobile has traveled the greatest distance with its original set of Hyatt roller bearings.

The winner had covered 261,800 in a 1909 Buick up to October, 1915, at which time the car was turned over to the judges of the contest, Alfred Reeves, general manager of the National Automobile Chamber of Commerce; Coker F. Clarkson, general manager of the Society of Automobile Engineers, and Julian Chase.

Besides Mr. Slason, fifteen other contestants have been awarded prizes, and the winning cars covered a total distance of 2,512,435 miles, which is equal to more than 100 times around the world. The average mileage of the sixteen contestants was 156,814 miles or more than six times around the world.

Of the sixteen winning cars six are Mitchells, four are Fords, two are Buicks, the other four being a Logan, a Mytag, a Hudson and a Flanders. The oldest car was the Logan, which was a 1906 model. One of the Buicks and one of the Fords were of the year 1906. The winning Buick, three Mitchells, the Flanders and one Ford were 1909 models. Three Mitchells, the Hudson and the Mytag were made in 1910, while two Fords were of the 1911 production.

THE WINNERS

1—F. E. Slason, Plainville, Kan., 1909—Buick, 261,800 miles.
2—James Lewis, Shelton, Conn., 1909—Mitchell, 218,734 miles.
3—J. W. Norman, Paint Rock, Tex., 1909—Mitchell, 183,837 miles.
4—Sam Deck, Darlington, Ind., 1910—Mitchell, 175,875 miles.
5—J. D. Albright, Bowie, Tex., 1911—Ford, 172,683 miles.
6—Earl G. Druding, Ellsworth, Wis., 1909—Ford, 171,418 miles.
7—S. T. — E. R. R., Stockton, Cal., 1909—Mitchell, 160,100 miles.
8—Jacob Stark, Chicago, Ill., 1906—Logan, 148,150 miles.
9—J. J. Moore, Philadelphia, Pa., 1911—Ford, 147,751 miles.
10—John Fraser, Jr., Milwaukee, Wis., 1908—Buick, 139,523 miles.
11—George R. Mason, Des Moines, Ia., 1910—Mytag, 135,000 miles.
12—J. M. Bertolet, M. D., Reading, Pa., 1910—Mitchell, 127,681 miles.
13—James W. Hines, Minneapolis, Minn., 1910—Hudson, 120,256 miles.
14—Linus Kiene, 1910—Mitchell, 120,000 miles.
15—L. N. Burnett, Dallas, Tex., 1909—Flanders, 116,557 miles.
16—F. I. Wiltse, Oneonta, N. Y., 1908—Ford, 113,061 miles.

Regulations of the Contest

The regulations of the contest which closed November 1, 1915, provided that any car is eligible, provided it had its original equipment of Hyatt roller bearings. The winner was to be the one whose car showed the greatest mileage and he was to receive $500. The next five prizes were respectively, $200, $100, $50, $30 and $20. The next ten to receive $10 each.

RATHSKELLER A GARAGE

Clayton, Mo., Feb. 5—Churches, theatres, dance halls and other places of amusement of the pre-motor car age have given way to the motor car and have been converted into garages, but it remains for Clayton, the Gretna Green of St. Louis, to sacrifice its youngest and most modern child—The Autenreith Rathskeller—to the gasoline and speed fiend.

The rathskeller, erected less than 5 years ago, at a cost of more than $15,000, and located opposite the Clayton courthouse, has been the scene of the wedding supper or breakfast of thousands of eloping couples. Its front, too, was a familiar and welcome sight to thirsty motorists who ever rode the roads of St. Louis county.

But now, as a rathskeller, it is no more. Now it serves as garage and salesroom for the St. Louis County Automobile Co., Overland dealers.

ELECTRICS INCREASE IN ENGLAND

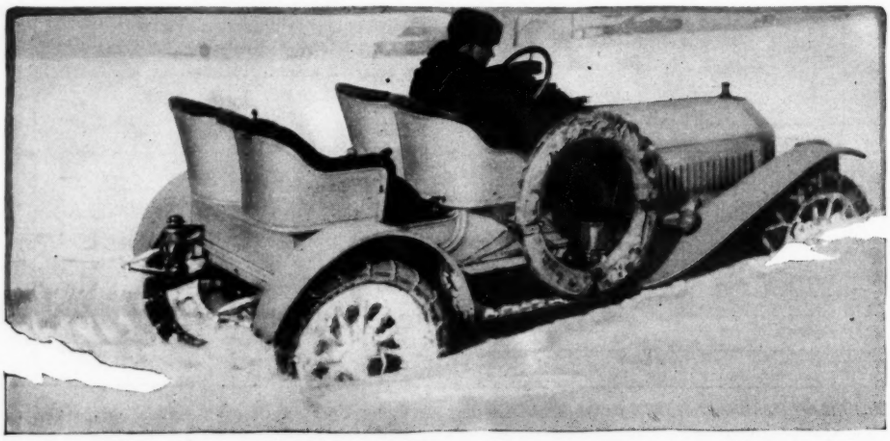
New York, Feb. 4—According to reports received by the Electric Vehicle Association recently from an English engineering firm, Heenan & Fraude, Ltd., the use of electrics there has increased greatly in the past year, from 150 a year ago to 660 today. The use of electrics has been stimulated to a great extent by the war, for due to the numbers of men who have been taken from commercial occupations by the wholesale enlistments, the majority of the truck drivers in England today are women. The electric is simpler to operate than the gasoline truck, and therefore better adapted to use with female labor. Another effect of the war has been to effect almost universal withdrawal of certain classes of gasoline trucks, through commandeering, so that to protect themselves, many firms have adopted electrics, for which the government has no need.

INLAND EMPIRE SALES DOUBLED

Spokane, Wash., Feb. 4—Despite the cold weather of the past month, Spokane dealers have sold and contracted to subdealers throughout the Inland Empire territory more than 500 cars, more than 100 per cent in excess of the number sold during the same period last year. The advent of the closed car has done much to boost retail sales. Evidence of the increase in the motor car business throughout the state is furnished by the report of Secretary of State Howell, which says license fees in 1915 amounted to $238,707, as compared with $60,146 in 1914. Of the amount collected, all but $76,000 goes into the permanent road fund.

NO SEMAPHORES WANTED

Milwaukee, Wis., Feb. 5—The Milwaukee police department will have none of the so-called "stop-go" mechanical signal device for the use of traffic patrolmen. An investigation of the system used in



F. E. Slason, the Kansas motorist, and his 1909 Buick, which covered 261,800 miles, winning Hyatt Roller Bearing mileage award

Chicago, Detroit, Minneapolis, Indianapolis and other cities is stated to have proven that it would not do in Milwaukee. Sergeant Patrick J. Gleason, in charge of the Milwaukee traffic squad, said: "Our traffic men have something else to do besides turning levers. They must look out for women and children, fallen horses, and a great many other things. If we stationed them in the center of the street with guide signs they could not leave, they could do none of these other things."

INSTALLS ROADSIDE TELEPHONES

Buffalo, N. Y., Feb. 4—Four hundred telephones are being installed, one every 2 miles along all the principal roads in western New York by the A. W. Haille Motor Co., Studebaker distributers in Buffalo. The plan is to give any owner of

Ralph E. Brown, secretary of the A. W. Haille Motor Co., the father of the roadside telephone plan

any car quick action in case of trouble on the road. Each 'phone is in a locked box, like that shown, and keys are rented to any car owner, regardless of the car he is driving, at a rate of 50 cents a year. The 'phones are connected with the telephone exchange and may be used for any purpose. There is no charge for calls within a radius of 5 miles.

OHIO STATE ASSN. TO CONVENE

Akron, O., Feb. 4—The annual convention of the Ohio State Automobile Association at Akron is set for March 31 and April 1. Because of the increase in automobile ownership in the state and the many new local clubs that have been formed, it promises to be the biggest gathering in the history of the organization.

Colorado's Inspection Gets Tax Dodgers

Novel Schemes for Defrauding State License Fund Unearthed by Examiners

DENVER, Col., Feb. 3—Colorado is proud of its 1915 record of motor car registration, which has just been completed from returns sent in by all the counties and which shows a total of 28,254 cars in the state, as against 18,433 in 1914. This is an increase of 9,821 cars, or 53 per cent. An estimate of 40,000 is considered conservative for this year, and Secretary of State Ramer has ordered that number of tags. The license revenue, which goes to the state and county road funds, amounted to $107,664.70, as compared with $70,382 in 1914, showing a gain of $37,282.70.

Some lively sidelights on the 1915 registration were brought out by a license inspection system inaugurated by Secretary Ramer and carried through with a necessarily high degree of determination—and sometimes a touch of drama—by Chief License Inspector De Lochte.

Even a Minister

All sorts of evasions of the law were unearthed, along with an astonishing amount of negligence, and both the carelessness and the evidently willful attempts to defraud the state were found to a surprising extent among persons of distinction in business, professional and social circles. At least one fashionable minister of the gospel, for illustration, was found to have registered his car below the proper horsepower and when the inspector called him by telephone and inquired whether he preferred the society column or the church column as the place for mentioning his thrift in saving $5 by making a false affidavit concerning his car, the reverend gentleman ran serious risk of being arrested for speeding while on his way to the state house to pay the additional fee required and have his machine properly registered.

In a few cases, these evasions of the law took the bold and rather crude form of home-made license tags, which were detected through duplication of a number recorded under another name, and through defects in painting, etc. Trying to imitate a license tag from some other state, and then operating a car here under the "home" license and a Colorado license for visitors was another trick tried to the sorrow of a few wiseacres.

It was a rich harvest of dodged fees that Inspector De Lochte reaped at county fair time, and he also encountered considerable excitement outside of the regular attractiveness provided by the fairs. Often some community great man would take offense at being approached and asked to excuse himself from his lionizing friends for a little private conversation regarding a registration certificate he somehow failed to have, and he would invite the inspector to settle the dispute by a fist fight.

Again, when he struck some rancher with a better sense of humor, the delinquent car owner would chuckle at being caught in his clever and thus-far successful trick, and would straightway invite the inspector to join the family at chicken dinner. De Lochte usually accepted all invitations—and always brought home the license fee.

Several taxicab companies, real estate firms and other concerns using a large number of cars were also caught with dealers' licenses, and compelled to take out regular owners' licenses, as required by law, and to pay whatever additional fees were involved.

Inspector De Lochte and his one deputy traveled over 5,600 miles in this work, visited the principal parts of thirty-eight out of the sixty-three counties in the state, and collected $11,731.50 in fees neglected and dodged in different ways by motor car owners, dealers and drivers. There were 2,071 cases where owners had either failed to take out any license whatever or had registered their cars in a lower horsepower class at a lower fee; 176 non-registrations and improper registrations under the dealers' class, and 917 drivers who were driving other people's cars without required driver's license.

Know the Wise Guys

Less trouble of this kind is anticipated for 1915, for the reason that people realize that this inspection is no bluff, the authorities are trying patiently to educate car owners that they are cheating themselves through trying to keep this money from the funds to build roads for their use, and the inspection work can be still better organized this year by taking advantage of last year's experiences. "And I've got the name and number of every wise guy that tried to put something over last year," adds Inspector De Lochte, "and he knows he'll be watched."

Another point being called to the attention of car owners by Secretary Ramer and his inspectors is that failure to comply fully with the registration law is liable to invalidate any claim brought in court by the car owner in case of accident or theft involving his car.

This inspection work is strongly endorsed by the Denver Motor Club, and the 1915 results in saving revenue for the state are held to demonstrate the wisdom of the bill put through the state legislature by the club a year ago to provide for four license inspectors in connection with the motor vehicle license law. The measure was vetoed, however.

The Readers' Clearing House

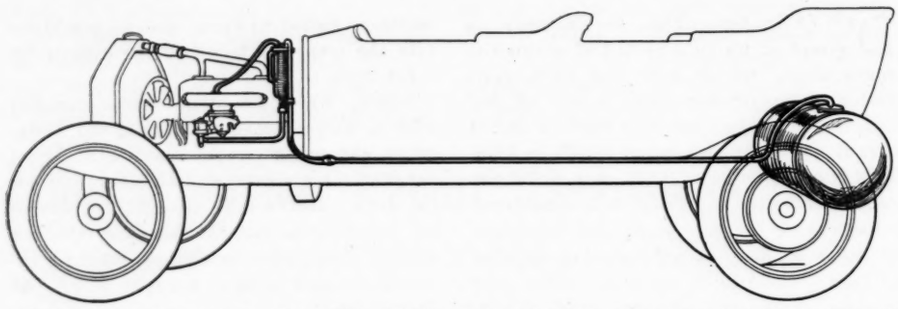


Fig. 1.—Showing the usual location of the tank of the Stewart vacuum fuel feed system. It will be noted that there are three pipes leading from the tank. One of these leads to the rear container, another to the inlet manifold and the third to the carbureter

GASOLINE USED PER HORSEPOWER

One-Eighth Gallon Per Hour Is Amount Authorities Agree Upon

BAY CITY, Mich.—Editor Motor Age—What proportion of length of connecting rod to length of stroke is good practice in long-stroke engines?

2—Can vanadium steel be cast with success ⅛ of an inch thick? If so, what is the ultimate strength of such castings? If so, how thin can it be run?

3—What is the highest engine speed ever developed?

4—What oiling system was used?

5—What size carbureter does Motor Age recommend for an eight-cylinder engine of 600-cubic inches displacement? What size for a four-cylinder 300-cubic inch engine?

6—How much gasoline should a motor car engine use per horsepower per hour?—Reader.

1—About 2 to 1.

2—That depends entirely on the part and the service it has to render.

3—Somewhere around 5,000 r.p.m.

4—This information is not available.

5—The question of carbureter size for cars coming under either of the classes varies considerably. Even though two cars have the same displacement, the bore and stroke, length of valves, etc., may differ and these are factors in determining the proper size. The same holds good with cars of any displacement. If you will be more specific in your inquiry, giving some individual car to be fitted with a particular make of carbureter we will be able to advise you more accurately.

6—The quantity varies considerably, according to engine design, but a fairly reliable constant on which a number of authorities agree is ⅛ gallon of gasoline, having a specific gravity of 0.75, per actual horsepower, per hour.

Valve Timing of Old Winton

Pittsburgh, Pa.—Editor Motor Age—What is the compression and valve setting of the 1909 Winton Six?—H. Werron.

The compression is 65 pounds. The valve setting is as follows: Exhaust opens 54 degrees before dead center and closes 16 degrees past dead center; intake opens 21 degrees past dead center and closes 34 degrees past dead center.

Float Probably Not Adjusted

Champaign, Ill.—Editor Motor Age—Does Motor Age issue a yearly index of the articles published from week to week? If not, how might I procure one?

2—Is there any truth to the assertion that motors in six-cylinder cars are harder on spark plugs than the four-cylinder motors?

3—What is the gear reduction in the Paige 6-46 in reverse, first, second and high?

4—What is the cause of gasoline dripping from my Rayfield carbureter only for a few seconds after stopping the motor? It cannot be condensation. It never leaks.—S. E. Rugh.

1—No. But we keep a complete index in this office.

2—No.

3—First, 14.160 to 1; second, 7.189 to 1; third, 4.357 to 1; reverse, 18.865 to 1.

4—Probably the float is not properly adjusted.

ADJUSTING WHITE STEERING GEAR

How to Clean the Reflectors of the Headlights Without Injuring Them

Calgary, Alta.—Editor Motor Age—What preparation do you recommend for cleaning the highly polished reflectors of electric headlights without scratching them?

2—Is there any way of taking up the wear in a 1911 White steering gear?—A Reader.

1—Use a little jewelers' rouge or whiting, applying with a moistened cloth and rubbing dry with another cloth.

2—The White steering gear is of the worm and sector type. The construction and adjustments are indicated in Fig. 5, page 82, issue of January 20. Any up-and-down lost motion in the steering stem can be taken up by the adjusting nut located at the bottom of the steering gear case held in position by a binder screw. The bushing for the gear sector is eccentric, and in order to take up lost motion in the worm, adjust the sector into the worm by loosening the set screw on the under side of the steering gear hub. Disengage the steering lever from the gear and adjust the bronze bushing enough to take up any lost motion.

DETERMINING PLAY IN BEARING

Can Tap Lightly With Hammer to Tell—Meaning of Tread

St. Charles, Ill.—Editor Motor Age—How can one tell when a connecting rod bearing is all right? Is it possible to do this with a hammer? Should it run somewhat tight when testing by hand? By this, I mean, when one turns the crankshaft over.

2—Why are wire wheels not more universally used? If wire wheels can stand the strain of racing, why are they not good for the road?

3—What are the Chicago traffic signals?

4—What is meant by 36-inch tread? That is, 28 by 3 tires, 36-inch tread.—A. Larson.

1—With a little experience, you should be able to tap the bearing cap lightly with a hammer and tell if there is any play. It should not run too tightly, but snugly, so that the shaft can be rocked by hand when the compression is relieved by opening the petcocks.

2—Wire wheels are perhaps more extensively used than you realize.

3—One whistle for north and south traffic to move and two for east and west.

4—The tread is the distance between the wheel tracks. To be exact, it is the distance from the center of width of one tire to the same point on the opposite tire.

WORKING OF THE STEWART FEED

Detailed Description Given—Reader Also Wants Parts for Thomas Flyer

Ann Arbor, Mich.—Editor Motor Age—Please explain the Stewart Vacuum gasoline system.

2—Where can I get parts for the Thomas Flyer?—Carl W. Parker.

In the Stewart vacuum feed system the tank at the rear of the chassis remains in position, the cowl tank is done away with, but a small tank containing a float mechanism is placed on the dash. This small tank, by means of motor suction, draws the fuel from the rear tank and then feeds it to the carbureter by gravity, making air pumps or air lines of any description unnecessary.

The system comprises a cylindrical tank about 9 inches deep and 3 inches in diameter, mounted on the motor side of the dash, or any other convenient place. This tank is divided, by a suitable partition, into two compartments, an upper and lower chamber. The upper is connected to the intake manifold by one pipe and to the gasoline tank at the rear of the chassis by another. The lower compartment is connected to the carbureter in the regular way.

Within the upper compartment is a float, which controls two valves. The operation of the engine causes a vacuum to be formed in the upper compartment and this causes fuel from the supply tank to rush to the upper chamber. As soon as the float has risen high enough, one of the valves mentioned closes the connection between the compartment and the intake manifold, thus stopping the vacuum, which allows the atmospheric pressure to act on the gasoline which entered the chamber. The atmospheric pressure forces the fuel from the upper chamber to the lower through a common flap valve and from the lower chamber feed is by gravity.

In Fig. 2 is shown a section view of the vacuum tank. At D is attached the fuel pipe, which runs to the rear gasoline tank, as shown in Fig. 1. At C is fastened a pipe which attaches to the intake manifold

and at K is the connection to the carbureter. The upper and lower compartments of the tank are divided and communication between them is by means of the flap valve H. This is nothing but a hinged plate covering and uncovering a part automatically.

Since the fuel from the lower chamber feeds by gravity, atmospheric pressure must be present in this chamber at all times and to get this condition, the chamber is made to communicate with the outside air by means of the pipe connection L to an air vent. The upper chamber contains a float, which by linkage E and F and the spring S opens and closes the valves A and B.

Let us suppose the engine is running. Because the upper chamber communicates with the intake manifold, the suction strokes of the motor will cause a vacuum to be created in the upper chamber and when this is so, the fuel from the rear tank fills the vacuum. When the fuel enters the upper chamber the float rises and when it reaches a fixed point, the vacuum valve A is closed just as the float valve of a carbureter is closed when the float reaches a certain point. The linkage is such that the closing of the vacuum valve causes the atmospheric pressure valve C to open. This is true because the lever E, more clearly shown in Fig. 3, is pivoted at P, and the vacuum valve has its seat on

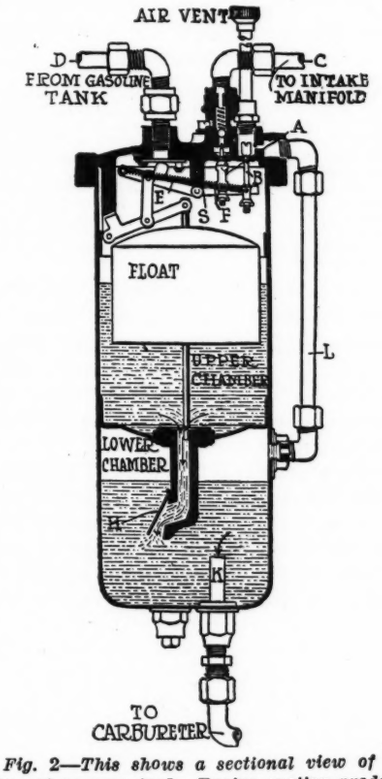


Fig. 2—This shows a sectional view of the Stewart vacuum tank. Engine suction produces a vacuum in the upper chamber, which causes fuel from the rear tank to flow through the pipe D to the upper chamber. As soon as the float rises to the top the vacuum valve A closes and the atmospheric valve C opens. This allows atmospheric pressure to act in both chambers and the flap valve H opens, the fuel drops to the lower chamber and then feeds to the carbureter by gravity

Communications Received and Inquiries Answered

Reader	Bay City, Mich.
H. Werron	Pittsburg, Pa.
S. E. Rugh	Champaign, Ill.
A. Reader	Calgary, Alta.
A. Larson	St. Charles, Ill.
Carl W. Parker	Ann Arbor, Mich.
A. J. Yarber, Jr.	Sidney, O.
Jesse Hall	Sturgis, S. D.
Harold E. Chaney	Glenwood, Ind.
F. L. Butler	Quincy, Ill.
C. D. H.	Hicksville, O.
A New Reader	South Bend, Ind.
M. A. Bliss	Jamestown, N. Y.
C. R. Keen	Kennes, Ill.
W. D. Blackman	Shreveport, La.
Wolfin Bros	Amarillo, Tex.
A Reader	Miami, Fla.
General Motors Co	Tupelo, Miss.
Inquirer	Chicago
W. A. Buman	Harlan, Ia.

No communication not signed with the inquirer's full name and address will be answered in this department.

the opposite side of the atmospheric valve. It is evident that when the lever moves downward, valve B will close and valve A open. As soon as B opens the atmospheric pressure, about 15 pounds per square inch, acts upon the fuel in the upper chamber, which forces the fuel down through the opening previously sealed by the flap valve and into the lower compartment. As soon as the upper chamber is low in fuel, causing the float to drop, the suction valve again opens, creating a vacuum, which immediately is filled and the process described repeated.

2—From the E. R. Thomas Co., Buffalo, N. Y.

READER WANTS TO TRANSFORM CAR

Will Reincarnate Old Buick Into a Speed Vehicle.

Shreveport, La.—Editor Motor Age—I have a model 19 Buick which I wish to convert into a speedster. Kindly suggest necessary changes to be made to secure the most speed out of it. —W. D. Blackman.

The weight distribution over the front and rear wheels should be made as nearly equal as possible so that car will hold the track and take the turns without upsetting. This rule is followed out in designing car for racing. The center of gravity is made as low as possible to accomplish the same end. The motor should be balanced by making the reciprocating parts as nearly equal as possible in weight. The crankshaft must be perfectly balanced, the connecting rods to weigh the same, in fact, there must not be more work thrust upon one cylinder than upon another. By reducing the body weight the car will give greater speed. The new body should be such that wind resistance is reduced considerable, for this is one great factor in speed. By reducing the gear ratio still greater speed may be obtained, but the life of the car would be short with a gear ratio of less than 3½ to 1.

Suggest Exhaust Manifold Changes.

Keenes, Ill.—Editor Motor Age—If E. W. Anderson, Grand Mound, Ia., will take four short pieces of tubing and have a small piece of iron welded on to each, he will find these superior to the short exhausts, shown in Fig. 2, November 25 issue. The tubing must be of the same size of ring which connects the exhaust manifold to the motor. See Fig. 5—C. R. Keen.

SOME ANTI-FREEZING SOLUTIONS

Advised Against Using Salt or Coal Oil—Alcohol Better

Lamy, N. M.—Editor Motor Age—Would salt water in a radiator be successful for an anti-freezing solution? If not, would half water and half wood alcohol be all right?

2—Would straight coal oil be O. K.? The radiator and hose do not leak—T. W. Hanna.

1—It could be used, but may set up an electrical action, or cause metal to corrode. Half water and half wood alcohol will resist freezing until the temperature reaches 37 degrees below zero. You should not require a solution of that mixture in your locality.

2—Coal oil, or kerosene, heats rapidly, and dangerous gases result. It also will injure hose connections.

POWER LOSS DUE TO THE MUFFLER

At Ordinary Running Speeds Cutout Shows Little Gain

Jamestown, N. Y.—Editor Motor Age—What is the relative difference in efficiency of a four-cylinder motor equipped with a muffler and a cutout?—M. A. Bliss.

1—The power loss due to the muffler varies as the r.p.m. increases and Fig. 4 shows two horsepower curves of a four-cylinder motor, one taken with the muffler on and the other with the muffler removed. In one test made by a certain manufacturer on a four-cylinder motor, the following results were obtained:

R. P. M.	Horsepower—Muffler On	Horsepower—Muffler Off	Loss
600	17.6	18.9	1.3
700	20.0	21.5	1.5
800	22.3	24.0	1.7
900	24.3	26.2	1.9
1,000	26.1	28.1	2.0
1,100	27.5	29.7	2.2
1,200	28.6	30.9	2.3
1,300	29.3	31.8	2.5

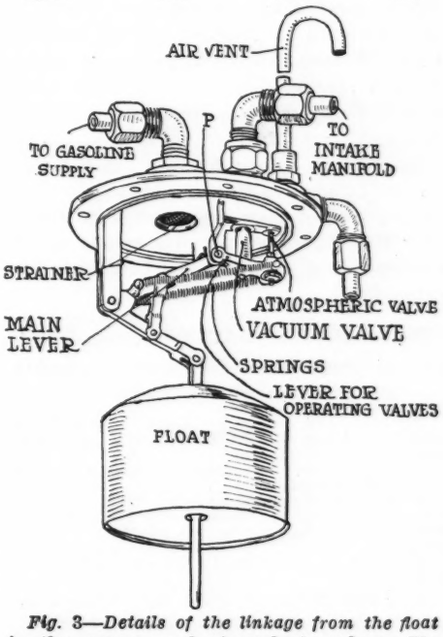


Fig. 3—Details of the linkage from the float to the vacuum and atmospheric valves. The former has its seat facing upward and the latter downward, so that when one valve closes the other must open

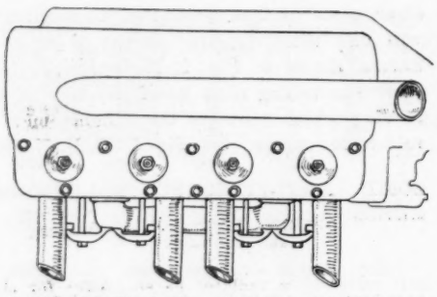


Fig. 5—Illustrating how a reader suggests putting short exhaust pipes on a Ford. He believes this method better than that suggested in a recent issue

If the muffler is one of good design the losses may not come so high as indicated, and in the modern car, operating at an average speed of 20 miles per hour, the loss is very slight.

EFFICIENT SPEED OF OVERLAND 83

This Ranges Near 1,000 Revolutions Per Minute—Maximum 2,000

Chicago—Editor Motor Age—What is the best efficiency speed in revolutions per minute of the motor in the Overland model 83; and what do you consider the highest motor speed suitable for rational road use in this country?—Inquirer.

1—The most efficient speed of the model 83 motor is approximately 1,000 revolutions per minute. This corresponds to a road speed of approximately 27 miles per hour or to the speed at which the average driver tours in the country. The maximum horsepower is secured at 1,800 to 2,000 r. p. m.; this gives a motor which seems to suit a large majority of drivers. The question of motor speeds is a very large one viewed from all angles. It depends entirely upon what one wishes to accomplish. If you are in a contest limited to a certain displacement your only resource is to increase the r. p. m. to its highest point. The same holds true where one is designing to meet a certain taxation rate such as that used in England at the present time. Average speeds have shown a continuous increase over the last few years and probably will continue to increase at this small rate during the next period of 4 or 5 years. Should a general taxation scheme be adopted similar to that now used in England, it may be expected to see a very large increase in motor speeds and a corresponding decrease in bores of the cylinders.

INDIANAPOLIS RACING CAR DATA

Reader Wants Names of Cars Controlled by Hoosier Speedway

Tucson, Ariz.—Editor Motor Age—Which drivers and cars do the Indianapolis speedway association now control?

2—Can Motor Age supply a diagram of a Ford racing camshaft?

3—Instead of cutting material from the cylinder head of a Ford to increase the compression, would it be practical to put on a thinner gasket of some sort of oiled paper?

4—What is Carl Fisher's present address?—Bill Davis.

1—Four Maxwells and two Peugeots, and in addition, two cars are being built by the Premier company. Four drivers are under contract—Rickenbacher, Aitken, Wilcox and Burman.

2—Designing a camshaft for speeding up a Ford is a matter that varies to such an extent that it comes within the individual's own fancy. We suggest that you write some of the concerns advertising in the Clearing House department of Motor Age, who will make a design for you.

3—Yes.

4—Miami, Fla.

WHO MADE FIRST SIX-CYLINDER?

Franklin Holds Record for Gasoline Economy with 86.6 M. P. G.

Harlan, Ia.—Editor Motor Age—What car was first in the field with a valve-in-the-head motor?

2—What was the first six-cylinder car produced in America?

3—What car has the world's record for gasoline consumption? How much was it?

4—Has the records made at Sheepshead by the Hudson been broken by any stock car either official or non-official?—W. A. Buman.

1—Valve-in-the-head motor have been used from the very first.

2—Credit is given the Stevens-Duryea company for the introduction of the six-cylinder car. It was in 1905 that Frank Duryea, of that company, saw a six-cylinder motor mounted on a chassis owned by Hinsdale Smith, of the Springfield Metal Body Co. Duryea brought out a six in 1905, being followed by Henry Ford in 1906.

3—The Franklin made a record of 86.6 miles per gallon.

4—Motor Age knows of no instance in which this record has been excelled by a stock car.

TAKES EXCEPTION TO STATEMENT

Communication Published Last September Brings Counter Charge

Amarillo, Tex.—Editor Motor Age—In Motor Age several numbers back you had an article, "A Warning to Tourists," in which we are much concerned. This article was written by George W. Richards. We have had a registered letter, which we addressed to him, returned to us marked "Unclaimed." We do not believe there is any such party; at least we have no record of his having been in our garage.

We feel that we have been materially hurt by this article and we would like to have you trace this matter and see who Mr. Richards is, for we absolutely deny treating anyone as he says he was treated.—Wolflin Bros.

In the article mentioned George D. Richards criticized the Wolflin Garage, declaring that it did not "show any courtesy to the touring public unless they are more than paid for services rendered." Incidentally it was said that another garage did some work in 4 hours that the Wolflin Garage wanted to send to some other town for.

Motor Age has exhausted all means of getting in touch with George D. Richards. Several Points in Texas have been searched but aside from finding that he once lived in Dallas, no trace of him as to his actual whereabouts has been found. It was with no feeling of discrimination as between one garage and another that Motor Age published the communication. It was considered bona fide at the time it was received, but may have been an attempt to divert trade from one garage to another.

Cleaning Headlight Reflectors

Tupelo, Miss.—Editor Motor Age—Will you kindly inform me as to the best method of cleaning electric headlight reflectors?—General Motors Co.

1—It is best to use some jewelers' rouge or whiting, applying with a moistened cloth and rubbing dry with another cloth. This procedure will not scratch the reflectors and will give them a highly-polished surface.

DISTANCE WITH TIRES CHANGED

How Oversize Casings Make Speedometer Readings Inaccurate

Miami, Fla.—Editor Motor Age—If the speedometer on my car would register accurately with 35 by 4½ tires, how far would it throw my speedometer off if 36 by 5 tires were put on? How many miles in every 10 or in 100?—A Reader.

1—If your speedometer registered correctly with 35-inch tires and you add 1 inch to the diameter by fitting 36-inch tires, you add 3.14 inches to the circumference of the tire. Of course, the speedometer is set to register 1 mile every 5,280 feet, or every time the wheel turns around approximately 576 times, although every time the wheel turns when equipped with a tire 1 inch greater in diameter than that for which the speedometer is designed the travel is 3.14 inches per turn or 150.73 feet in 576 turns greater than registered. Thus it will be seen that when your speedometer registers 100 miles you really will have traveled 102.85 miles, or 2.85 miles more than your indicator registers.

ADVANTAGE OF ALUMINUM PISTONS

Light Connecting Rods and Alloy Pistons Increase Motor Speed

Brownsville, Pa.—Editor Motor Age—Does Motor Age advise the use of light connecting rods with aluminum pistons; in big 4-cylinder motors, and will such pistons work to the same advantage in motors of 4¾ or 5-inch bores that they do in smaller sizes?

2—Will speedometers of reliable makes, that measure distance accurately, indicate as accurately the rate of speed the car travels when running fast? If not, would it be by a very much greater margin than 5 miles per hour?—James F. Hill.

1—The use of light connecting rods with aluminum alloy pistons should result in somewhat higher piston speed and probably greater power development. They should work to practically the same advantage in motors of this size as with those of smaller bore.

2—As a general rule the speed indicator of the speedometer is not quite so accurate as is the mileage register, but any good instrument can be calibrated to give accurate results at these high speeds, if desired. It is doubtful in any case if the

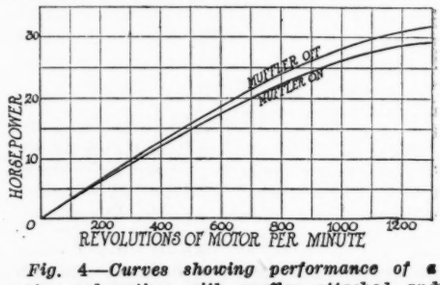


Fig. 4—Curves showing performance of a motor exhausting with muffler attached and without silencer. The loss increases with an increase in motor speed, as is evident from a comparison of figures at various speeds

difference between the registered speed and the car speed is likely to be greater than 5 miles per hour.

ROTARY GASOLINE ENGINE WORK
Much Experimentation with Little Financial Profit—Some Problems

Hicksville, O.—Editor Motor Age—Is there such a thing as an internal combustion rotary engine? If so, name the different makes.
2—Has there been much experimenting along this line, and where has the most difficulty been encountered?—C. D. H.

1—There has been a great deal of experimenting in the way of internal combustion rotary engines and gasoline turbines. In fact, there are dozens of them on file in the patent office. So far none of them has been a financial success.

2—One of the chief problems in design is getting a good seal between the rotating and stationary parts without causing too great friction. The introduction of the gas and the education of the exhaust also has presented some problems. Lubrication and cooling have been points that have caused difficulty. The fact that steam turbines have been so successful leads to the belief it may not be impossible to develop a successful gas turbine or rotary engine. There are many designs in the patent office.

FORD CAR MISSES ON HIGH SPEED
Diagnosis Points to Need of Carbureter Adjustment and Late Spark

Sidney, O.—Editor Motor Age—Kindly advise me what is the trouble with my Ford car. When the motor is speeded up it begins to miss badly on different cylinders. A new carbureter does not relieve the trouble, nor does the grinding of the valves, installing a new timer and coil box. The compression is good, however. I purchased an Atwater-Kent battery outfit, not the spark-control type. In addition to the above difficulties there is constant heating. At first I thought the trouble was in the radiator and bought a new one, but this did not remedy the trouble; a pump helped slightly.—A. J. Yarber, Jr.

It seems from your description of the difficulties that originally the trouble was due to improper high-speed adjustment of the carbureter, particularly if, as you did not say, the motor ran well on low speeds. Had you not had the same trouble after putting on the new ignition system, a second cause might have been a badly worn timer, but, inasmuch as with a new timer installed the same trouble continued, it seems to point to carburetion. It is suggested that you get a good carbureter man on it for adjustment.

The heating which occurred after installation of the new battery outfit in all probability is due to the fact that you carry the spark too far retarded. If it is hand control, try keeping the spark advanced as far as possible without knocking. If you cannot cause a spark knock by advancing the spark and do not get a kick on cranking with the spark pretty well advanced, it is almost certain that your ignition is too late. Late spark is sure to cause heating.

GIVES DODGE STEERING GEAR DATA
Believes Inquirer Will Find His Remedy Beneficial

Quincy, Ill.—Editor Motor Age—For the benefit of the "Reader" in South Hampton, L. I., I wish to say that I have in several cases successfully remedied this trouble in Dodge steering gears when the play was even greater than 5 inches.

It is apparent to me from his questions that he has one of the older cars, with old-style gear. The installation of a new part would give only temporary relief. It would be much better in my estimation to remove and disassemble the gear, have some machinist cut a key way in the back of the worm nut and make a special key to fit in this slot, and to be fastened by screws to the gear housing. If properly fitted this key will prevent nut turning, and will take up most of the lost motions, although a new eccentric bushing should be installed.

By drilling holes in the adjustment plate on the outside of the frame to ⅜ of an inch and cutting ⅜-inch A. L. A. M. threads in the lock bolt hole in the frame, and using a cap screw and washer to lock the eccentric bushing adjustment much time will be saved in making future adjustments.—F. L. Butler.

Gearshifting on the Austin

Sturgis, S. D.—Editor Motor Age—In what order are the six speeds on the Austin two-speed axle shifted?
2—How does one measure the square feet of wind resistance?—Jesse Hall.

1—In any desired order. They are selective.

2—Figure the area of exposed surface which the wind would strike. To get it approximately, multiply the average height by the average width of the object.

Denatured Alcohol as Fuel

Glenwood, Ind.—Editor Motor Age—Will denatured alcohol work as satisfactorily in a motor car as gasoline? Is it necessary to make extra adjustments and are any appliances attached?—Harold E. Chaney.

Denatured alcohol can be used in a motor in place of gasoline, but not so satisfactorily as can gasoline with the present carbureters. It is necessary to have specially-designed carbureters if the best results are obtained. It is usually found necessary to adjust the carbureter for considerably more air. No extra appliances are needed.

On account of the relative cost of alcohol as compared with gasoline at the present time, the use of alcohol is not so economical as that of gasoline.

N. A. C. C. HORSEPOWER FORMULA
How the Capability of a Motor Is Calculated by Standard Rating

South Bend, Ind.—Editor Motor Age—Kindly explain how to use the N. A. C. C. formula. —A New Reader.

The N. A. C. C. formula, which gives the calculated horsepower of a gasoline engine is written at 1,000 feet per minute piston speed,

$$HP = \frac{D^2 \times N}{2.5}$$

in which

D is the bore of the cylinder in inches.

N is the number of cylinders.

2.5 is a constant.

In using the formula, multiply the bore of the engine in inches by the bore, then by the number of cylinders and divide by 2.5. For instance, to find the N. A. C. C. rated horsepower of a four-cylinder engine having a 5-inch bore and any stroke would be figured as follows: 5 squared equals 5 times 5, or 25, and 25 times 4 equals 100, and 100 divided by 2.5 equals 40, the N. A. C. C. horsepower of the motor.

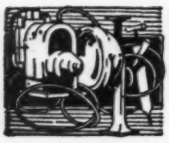
The table on this page gives the horsepower for engines of different bores and numbers of cylinders.

Table herewith:

Horsepower Table by N. A. C. C.—Formerly A. L. A. M. Formula; Also Known as S. A. E.

In using table, find bore of cylinder in inches or millimeters in the proper left hand column, then read across to right under column for the number of cylinders that the motor under consideration has.

BORE = D		NUMBER OF CYLINDERS = N			
Inches	Millimeters	4	6	8	12
2 1/16	64	10.00	15.00	20.00	30.00
2 5/8	68	11.03	16.54	22.05	33.08
2 3/4	70	12.10	18.15	24.20	36.30
2 7/8	73	13.23	19.84	26.45	39.68
3	76	14.40	21.60	28.80	43.20
3 1/16	79	15.68	23.44	31.25	46.88
3 1/4	83	16.90	25.35	33.80	50.70
3 3/8	85	18.23	27.34	36.45	54.68
3 1/2	89	19.60	29.40	39.20	58.80
3 5/8	92	21.03	31.54	42.05	63.08
3 3/4	95	22.50	33.75	45.00	67.50
3 7/8	99	24.03	36.04	48.05	72.08
4	102	25.60	38.40	51.20	76.80
4 1/16	105	27.23	40.84	54.45	81.68
4 1/4	108	28.90	43.35	57.80	86.70
4 3/8	111	30.63	45.94	61.25	91.88
4 1/2	114	32.40	48.60	64.80	97.20
4 5/8	118	34.23	51.34	68.45	102.68
4 3/4	121	36.10	54.15	72.20	108.30
4 7/8	124	38.03	57.04	76.05	114.08
5	127	40.00	60.00	80.00	120.00
5 1/8	130	42.03	63.04	84.05	126.08
5 1/4	133	44.10	66.15	88.20	132.30
5 3/8	137	46.23	69.34	92.45	138.68
5 1/2	140	48.40	72.60	96.80	145.20
5 5/8	143		75.94	101.25	151.88
5 3/4	146		79.35	105.80	158.70
5 7/8	149		82.84	110.45	165.68
6	152	57.60	86.40	115.20	172.80



The Accessory Corner

Cox welding and decarbonizing outfit

Cox Welding and Decarbonizing Outfit

THE Cox Brass Mfg. Co., Albany, N. Y., makes an outfit for $50, that price including a substantial case for carrying, which is designed to give all the necessities to do welding and decarbonizing except for the tanks. This outfit, which is illustrated in this department, may be used for reclaiming cracked or broken castings of cast-iron, cast-steel, brass, bronze or aluminum. According to the manufacturer almost anything in the welding line about a motor car may be repaired with this outfit.

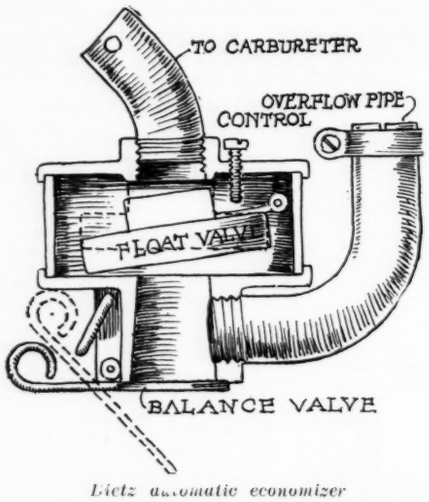
Dietz Automatic Economizer

A simple device to reduce the amount of gasoline required and to prevent the accumulation of carbon in motors has been invented by Henry Deitz, 416 West Fourth avenue, Denver, Colo. It is called the Dietz automatic economizer, and is claimed to be more efficient, economical and durable than the Deitz carbon absorber. It has been worked out to take the place of the earlier invention.

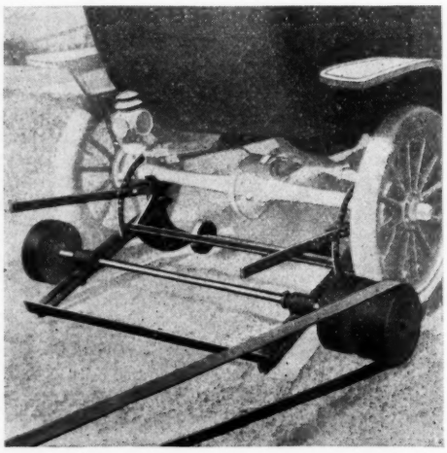
The main working parts of the new economizer are a float valve, balance valve and control screw. The other parts, besides the main frame, are a flexible steel tube leading to the carbureter and an overflow pipe.

The motor suction keeps the balance valve closed and draws moisture through from the top of the radiator to the carbureter, thus hydrating the combustible mixture, lessening the quantity of gasoline required, increasing the power of the engine and preventing the accumulation of carbon.

The suction **alone does not** raise the float valve and thus prevent moisture from going to the carbureter, but when the water boils in the radiator and the overflow is forced up into the shell, this effect will raise the float valve and cut off the suction, thereby releasing the balance valve and allowing a free flow of water outwardly. This prevents water from going into the carbureter, but when more power is needed for a steep grade, whatever moisture may be required can be let into the carbureter by the control screw. This arrangement produces practically the same condition as if no valves were used. There also is provision for locking the balance valve open for any desired length of time to prevent moisture from entering the carbureter, but this is seldom needed.



Lietz automatic economizer



Helping Henry, for use with Ford cars

The main frame, or shell, is made of brass, and the hydrating attachment and flexible steel tubing are packed with asbestos. It weighs a little over 1 pound and sells for $5.

Outlook Cleaner

A windshield cleaner made under the name of Outlook is the product of the Outlook Co., Cleveland, O. This was described in the January 20 issue of Motor Age, but classified under the heading of Polishes. This is not a polish, but a device that fits on the windshield and operates to clean the glass of snow and rain. It sells for $1.50.

Berry Rim

The Berry Rim Co., Detroit, Mich., makes a rim of the standard quick detachable type, but the product is simplified by making the detachable retaining flange in two parts, with hooks inserted in corresponding holes in the rim base and locked in the opposite ends by a bolt and nut. Since the retaining flange is in two parts, there is no spring to work against when removing it. It is said that this rim does not freeze on. The rim is shown in an illustration in this department.

Helping Henry

A device that makes the Ford do the work of a stationary engine is made by the Auto Appliance Co., 914 Michigan avenue, Chicago, under the name—Helping Henry. This device is illustrated in this department and consists of a rectangular frame carrying a shaft on the ends of which are pulleys, two on one end and one on the other. It is set under the rear end of the car, then through a jacking operation the wheels of the car are lifted free of the ground and brought in contact with the pulleys. The third pulley is for belting machinery to be operated to the device.

Helping Henry is designed to make the Ford operate the pump, jack, cream separator, milking machine, washing machine, feed chopper or other things about the

The Master chronograph

farm or shop where belt power is required. Price, $20.

Thermo Vacuum System

Thermo Vacuum Systems, made by a company bearing the same name as the product, in Detroit, Mich., is a fuel feed system which lifts the gasoline from the rear tank to a point where it can be fed to the carbureter by gravity. The tank is mounted on the engine side of the dash, with the bottom about 2 inches above the carbureter.

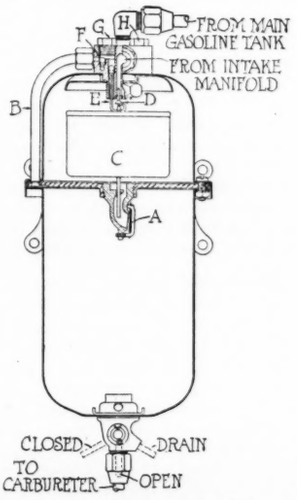
Looking at the sectional illustration, shown in this department, it will be seen that the tank consists of two compartments connected with each other by means of a flap valve A and an equaling tube B. The upper tank compartment contains the float C, which operates the suction valve D and the valve stem E to contact with the equalizer ball valve.

When the engine is started a vacuum is formed in the manifold and fuel is lifted to the upper compartment. Then valve A closes immediately and the atmospheric pressure until the fuel is lifted into the upper compartment. As the float rises the valve stem E comes in contact with the ball valve, which is held firmly in its seat by atmospheric pressure. The inrush of fuel continues until the float C becomes submerged, after which the float opens the valve to the lower compartment, at the same time cutting off the suction through valve D. It will be noted that there are two plugs, one marked G, being for giving accessibility to both valves and the other, H, for priming the device. It said that priming seldom is necessary, as a few turns of the starter fills the tank sufficiently to operate the engine, after which the tank refills automatically.

The device, which is made under the Weinberg patent of September 14, 1915, is guaranteed for 1 year, and sells for $7.50.

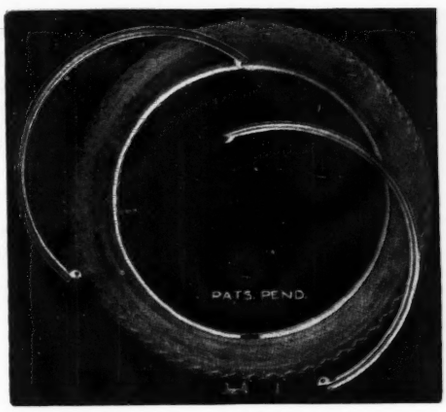
Henes Atomizer and Economizer

The Henes Sales Corp., 462 Deming Place, Chicago, is making an atomizer and economizer for Ford cars. A small quantity of gasoline is injected into this device, which is illustrated in this department, and immediately upon cranking the engine, the gasoline is forced through a special linen strainer which breaks up the gasoline and supplies it to the motor in the form of an atomized mist which makes starting a certainty, according to the manufacturer, without spinning the motor. This, it is guaranteed to do in the coldest weather.

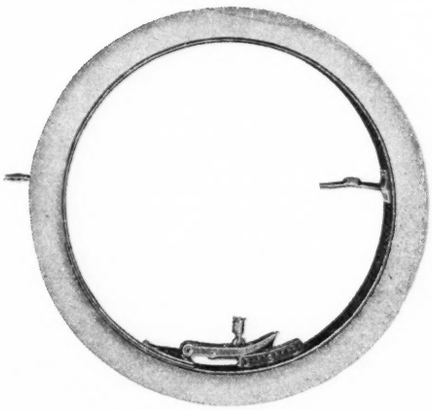


Thermo vacuum fuel feed system

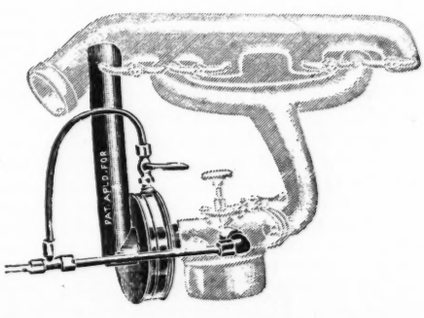
Leader air supply outfit



The Berry two-piece rim flange



Ray tire carrier and lock for Ford cars



Henes atomizer and economizer

The strainer is designed to remove all foreign matter from the air which enters the carbureter, materially lessening carbon deposit. The large drum shown in the illustration acts as a reservoir with a plentiful supply of warmed air which makes for better running of the motor, once it is under way. The device is made in two types, one of which sells for $2.50 and the other $3.50.

Ray Tire Carrier

The Packer Auto Specialty Co., New York and Chicago, is making a tire carrier and lock for Ford cars which is sold under the name of Ray. It is made to carry one or two tires, either 30 by 3 or 30 by 3½. It is designed to prevent tire chafing and is said to afford the same protection from mud and water getting inside the tire as though on the rim. It is guaranteed for the life of the car and is illustrated in this department. Prices $3 and $4.

Leader Air Supply Outfit

An economical portable air supply outfit, which is shown in the illustration on this page, is manufactured by the Leader Iron Works, Decatur, Ill. The complete outfit consists of a motor, air compressor, automatic controller, air tank, and fixtures.

The motor is a Westinghouse 1 horsepower, repulsion induction type having a high starting torque and low starting current. Frequent starting and stopping of the motor is eliminated by the use of a 14 by 36-inch welded air tank which is of sufficient capacity to inflate several tires. The air pressure in the tank is maintained at between 110 and 150 pounds, by an automatic controller on the motor. Thus air at the desired pressure always is available.

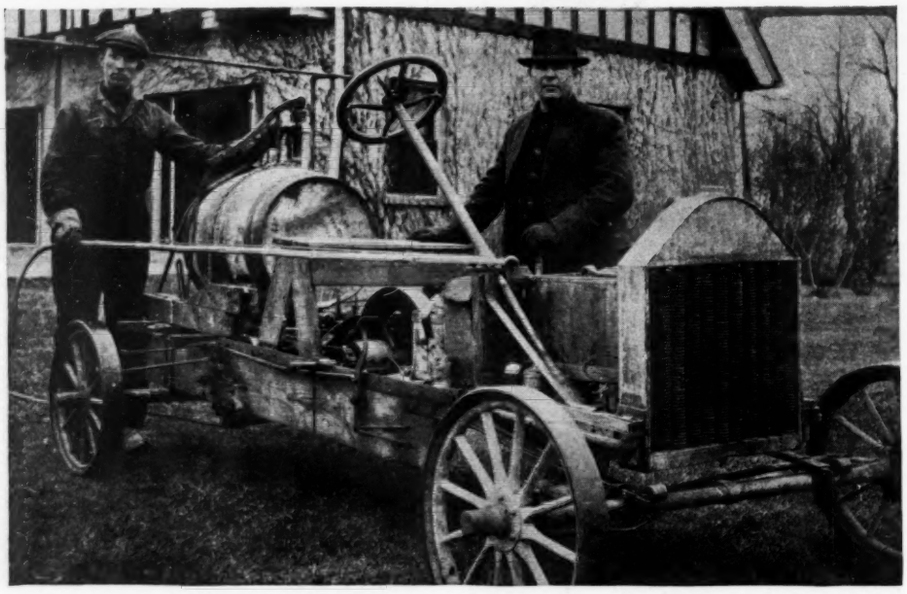
The compressor has a 2½ by 3-inch cylinder which is air cooled and provided with a hand unloader.

Master Cronograph

A new and improved instrument recently has been placed on the market which is useful in making time and motion studies, and in obtaining direct results of production per hour or per day, both for mechanical and manual operations.

The Master Cronograph operates entirely from the crown, being the start, stop and fly-back system. The timepiece feature is the same as any modern watch. The works of this instrument are said to be impervious to magnetism, to heat and cold, expansion and contraction. The case is of gun-metal. The product is of high-grade Swiss manufacture, and the exclusive sales are controlled by M. J. Silberberg and Associates, Peoples Gas building, Chicago.

From the Four Winds



UTILIZES OLD ONE-LUNGER—One of the first motor cars driven in the streets of Grand Rapids, Mich., at that time the property of a millionaire, now is being used as a spraying wagon by a caretaker at a city park. It was purchased and remodeled to serve its present purpose at a total cost of $11. The machine, equipped with a single-cylinder engine, was stripped down after the caretaker purchased it for $6. He rigged a secondary shaft midway between the main drive shaft and the rear axle and on the rear end mounted a barrel equipped with a force pump. The handle of the pump connects with a steel triangle which in turn is connected to a wood upright by a steel rod. The upright is held against a cam which, when it revolves, forces up the handle. It is drawn back into position by a pair of heavy springs. A clutch on the secondary axle negotiates the power. When it is out a chain drive to the rear axles serves to propel the machine. The spray is forced through a length of garden hose, a piece of hollowed bamboo and the top of a sprinkling can. The caretaker drives the machine over eighty acres of land and sprays his trees in less than a day where he once consumed from 3 to 4 days at the task. He has made the barrel demountable and replaces it with a centrifugal pump, which he uses in emptying the wading pools when a fresh supply of water is needed.

TEN Story Garage—What will probably be the largest and best equipped garage in the country will be erected in Philadelphia, Pa., for the Pennsylvania Taximeter Co. It will be ten stories high, with a frontage of 89 feet and a depth of 150 feet.

Ford Makes Pumping Station Inadequate—The village of Highland Park, adjoining Detroit, where the Ford Motor Co.'s main plant is located, will increase its water plant four-fold because its daily capacity is only 13,000,000 gallons of water. The Ford company has advised the village that before long the plant will require 30,000,000 gallons of water daily, or more. For this reason the village intends to quadruple the water plant's capacity.

New York's Taxi Ruling—Mayor Mitchel of New York has approved the new rule of the license bureau under which taxicabs measuring less than 48 inches from the front seat to the rear and less than 41 inches in width must carry a white flag on the taximeter as an indication to prospective passengers that only a single fare will be charged, even if more than two persons should occupy the machine. This new rule becomes effective February 1. Taxicabs measuring 48 inches or more by 41 inches or more will be permitted to charge a double fare when more than two persons are carried. This means 20 cents a mile more. This type of conveyance will carry a red flag. The charge for white flag taxicabs will be 30 cents for the first half mile and 10 cents for each succeeding quarter mile. The double tariff of the red flag taxicabs is 40 cents for the first half mile and 10 cents for each succeeding sixth of a mile.

White Clothing for K. C. Cops—Kansas City, Mo., traffic patrolmen have been furnished white rubber coats, caps and gloves for wear on rainy and misty days. It is intended to make the crossing patrolmen more discernible on dark days.

Combine Against Rate Cutting—With the idea of preventing senseless rate cutting and other unprofitable competition, the truck owners and drivers of Mohave county, Ariz., have formed an association. More than 100 trucks are running between Kingman and Oatman, the new boom gold mining camp, 26 miles southwest of Kingman.

Maine and New Jersey Registrations—New Jersey now has more than 90,000 motor cars, of which 79,300 are passenger and 11,000 commercial vehicles. In Maine 21,574 cars were licensed in 1915. Maine is working out a state highway system which will connect 73 per cent of the population of the state and make all the points of interest accessible to tourists over good roads.

Ontario Fourth in Cars—Only four countries in the world have more cars than the province of Ontario—the United States, the British Isles, France and Germany. This interesting fact is shown by the registration figures of the provincial secretary at Toronto. Close to 35,000 cars now are registered in Ontario. This record includes over 12,000 Fords. In all, there are 347 different makes of cars. As a matter of fact the Canadian Ford company's output of 40,000 cars for this year alone will be more than half as many as the cars of all makes now in Germany, 57,000, and a third as many as are in France, 90,000.

Recruit Army in Ford Branch—The Toronto branch of the Ford Motor Co. of Canada, Ltd., has turned over a portion of its salesrooms for an army recruiting office. Arrangements for the enlisting station were completed with Capt. Pink, while Major Le Grand Reed, who is in general charge of recruiting in Toronto, has been offered the use of a private office in the Ford branch building, which was completed early this year at a cost of over $325,000.

Shortage of Cars in Northwest—Nineteen sixteen is going to witness a shortage of motor cars in the Pacific northwest. That is the startling condition that is faced by the majority of motor car distributers engaged in business in Oregon and Washington. The situation is one that is causing no small amount of worry on the part of dealers and incidentally is furnishing food for thought on the part of those prospective buyers who are delaying the placing of their orders.

Must Keep Lights Trimmed and Burning—The police of Kansas City, Mo., have started a campaign against the motorist who drives his car at night with only one of the front lights burning. The police claim several accidents have been the result of pedestrians and other motorists mistaking the single light for that of a motorcycle. Thirty arrests for violation of the double-light ordinance were made one night last week. Fines of $5 and $10 were imposed on the offenders in police court.

Ohio Registrations Increase—Up to January 27, the Ohio registration department had registered 82,000 gas cars for owners; 1,600 dealers and 2,600 electrics. This number is more than twice the number registered up to the same time in 1915. Applications for registration are coming in faster than ever, stimulated by the excessive warm weather. The department has all of the applications that can be handled and consequently police departments in many places are very lenient as to enforcing the 1916 tag rule. It is believed that more than 1 month's leeway will be necessary in order to permit all owners to register.

Motors Daily Through 2-Foot Snow—W. E. Reeves, Paternos, Wash., has inaugurated and now is maintaining, a winter motor schedule from Paternos to Twisp, a distance of 35 miles, notwithstanding that there is 2 feet of snow the greater portion of the distance. The feat is accomplished by setting each of the front wheels in 5 inches and the rear wheels 4½ each, without making any change in the body of the car, a 1915 Ford. This narrowing of the machine allows the wheels to travel in the tracks made by the ordinary sleigh, providing a road that compares very favorably for the car to the paved highways.

Ohio Garagemen Change Name—A meeting of the board of directors of the Ohio Garage Owners' Association, Columbus, O., was held in the offices of the organization, last week when steps were taken to change the name to correspond with that taken by the national association. In conformity with the change, the Ohio organization will be called the Ohio Automobile Trades Association. R. A. Wilson has been engaged to throw a corps of organizers in the Buckeye state for the purpose of forming local associations and securing state

members where locals can not be supported. This work will start in about 2 weeks.

Plan Downtown Cincinnati Garage—Plans for a downtown garage to house 1,000 cars to be built after the latest garage idea have been prepared by the Wray-Chase Motor Service Co., Cincinnati, O. It will be located in the downtown business section and will be the largest in the Middle West. The new company has been organized by the election of J. Morris Wray, president and general manager; Wilson Chase, secretary and treasurer and Millard G. Durham, vice-president. The company is capitalized at $100,000 of which $50,000 is preferred and $50,000 common stock.

Drives Car with Ribbons—The story of a new kind of motor car demonstration has arrived from Oklahoma City, Okla. The new demonstration was originated by W. W. Land, manager of the Oklahoma Motor Sales Co., who wished to make a graphic showing of the easy steering qualities of the Jeffery. He did so by fastening a piece of ribbon about 10 feet long to each side of the steering wheel and running them back over the front seat. Mr. Land sat in the rear seat and drove the car through the downtown business section where hundreds were attracted at his novel plan of driving.

Good Roads Activities

Road Up Mt. Shasta—Construction of a road up Mount Shasta with a view to popularizing the Shasta National Forest is interesting motorists of northern California, who will have the coöperation of the Northern California County Association, in carrying out their plans.

Dixie Highway Expenditures—Over $1,765,200 has been expended in 6 months on the Dixie highway alone, in fifty counties, or about one-third of all the counties affected. It is estimated that over $5,300,000 has been spent on the highway to date, and that $20,793,000 will be expended along the route during the present year.

Highway Department for Ontario—A department of highways has been created by the Ontario government. It will be associated with the public works department, and W. A. MacLean, provincial highways engineer, now will be a deputy minister. Hon. Findlay MacDiarmid will have the title of minister of public works and highways.

Oregon Gets Road Funds—Secretary of State Olcott, of Oregon, has apportioned to the counties of the state money received from motor vehicle licenses for 1915. The total receipts amounted to $108,881.50. Of this amount $87,230.08, or 80.1 per cent of the total receipts was returned to the counties for road improvements. Of the total receipts for 1914 78.7 per cent was returned to the counties, and for 1913 76.6 per cent.

New Angle to Road Paving—A movement was started at the closing session of the Hamilton County Farmers Institute, Cincinnati, O., to have the county commissioners make a radical change in material used in the construction of country roads. Several farmers who took part in the discussion objected vigorously to the further use of tar dressing, contending that in time it causes the surface of the road to become as smooth as enamel. They pointed out that this enamel-like surface affords no safe footing for a horse, and declared that many accidents on country roads in which animals have been injured and their drivers placed in peril are traceable directly to this pavement. The suggestion was made that if the county commissioners do not desire to go to the great expense of eliminating it entirely a compromise can be reached whereby one side of a road can be covered with a layer of sand and the other with the tar dressing. On roads improved in this manner horse-driven vehicles would stay on the sand and motor cars on the smooth surface. It was stated that the Cincinnati Automobile Club will cooperate with the Farmers Institutes to have country roads divided equally between a sandy and a tar surface.

Highway Engineer Moves Up—Julius Adler, engineer of tests of the Pennsylvania state highway department, has been appointed engineer of construction of the department to succeed John T. Gephart, Jr., who resigned to become consulting engineer of Fayette county. Mr. Gephart has been in the department since September, 1905.

Washington Spends Much for Roads—The State of Washington expended for roads to January 1, 1915, $7,117,769, or at a rate of $7 per thousand of assessed valuation. The state is paying as it builds to its system of highways and at that it is said to be progressing as rapidly as any other state in the union in mileage constructed.

Make Plea for Link—A delegation from Athens and Nelsonville, O., called on Governor Willis and State Highway Commissioner Clinton Cowen to get co-operation from the state in completing the paved highway between Athens and Nelsonville. A 3-mile gap is open in the roadway, and the citizens wish it to be completed during the present year.

Voices Road Opinion—Senator John H. Bankhead of Alabama, chairman of the committee on postoffices and postroads, is of the belief that the present Congress will agree upon a good roads measure that will accelerate highway progress throughout the country. He voices the belief that any plan for military preparedness will embrace a provision for road construction. He believes every state will be ready to bear its share of any expense incurred in bringing its roads up to a high standard, provided the federal government shares a part of the expense incurred. He points out that the better roads will be a benefit in times of peace as well as in war.

Urges Against Oiled Roads—Superintendent of Highways Emery, of Peoria county, Illinois, spoke before the state meeting of highway superintendents at Peoria, Ill., recently and among other things said that oil should be put on the roads, only when nothing better and more permanent can be done. This idea was incorporated in the resolutions adopted by the body. The meeting also went on record as opposed to the narrowing of roads to 40 feet. This is a matter, it was said, that should be governed entirely by local conditions.

Coming Motor Events

SHOWS

February 12-19—Hartford, Conn., show.
February 14-19—Des Moines, Ia., show.
February 16-19—Bloomington, Ill., show.
February 17-19—Racine, Wis., show.
February 19-26—Harrisburg, Pa., show.
February 20-27—Grand Rapids, Mich., show.
February 21-26—Louisville, Ky., show.
February 21-26—Omaha, Neb., show.
February 21-26—Syracuse, N. Y., show.
February 22—Los Angeles, Cal., speedway race.
February 28-March 4—Cedar Rapids, Ia., show.
February 28-March 4—Utica, N. Y., show.
February 28-March 4—Indianapolis, Ind., show.
February 29-March 4—Sioux City, Ia., show.
February 29-March 4—Fort Dodge, Ia., show.
March 4-11—Boston show.
March 8-11—Davenport-Rock Island-Moline show.
March 8-11—Mason City, Ia., show.
March 9-11—Kenosha, Wis., show.
March 15-18—Trenton, N. J., show.
March 20-25—Twin Falls, Idaho, show.
March 21-25—Deadwood, S. D., show.
March 22-25—Saginaw, Mich., show.
April 10-15—Seattle, Wash., show.

CONTESTS

May 6—Sioux City, Ia., speedway race.
May 13—New York, Sheepshead Bay speedway race.
May 20—Chicago speedway amateurs' race.
*May 30—Indianapolis speedway race.
June 10—Chicago speedway race.
June 28—Des Moines, Ia., speedway race.
July 4—Minneapolis speedway race.
July 4—Sioux City speedway race.
July 4—Track meet, Couer d'Alene, Ida.
July 15—Omaha, Neb., speedway race.
August 3-5—Hillclimb, Pike's Peak, Colo.
August 5—Tacoma speedway race.
August 18-19—Elgin road race.
September 4—Indianapolis speedway race.
September 9—Des Moines, Ia., speedway race.
September 15—Indianapolis speedway race.
September 29—Track meet, Trenton, N. J.
September 30—New York, Sheepshead Bay speedway race.
October 7—Omaha speedway race.
October 14—Chicago speedway race.
October 19—Indianapolis speedway race.

* Sanctioned by A. A. A.

With the Motor Clubs

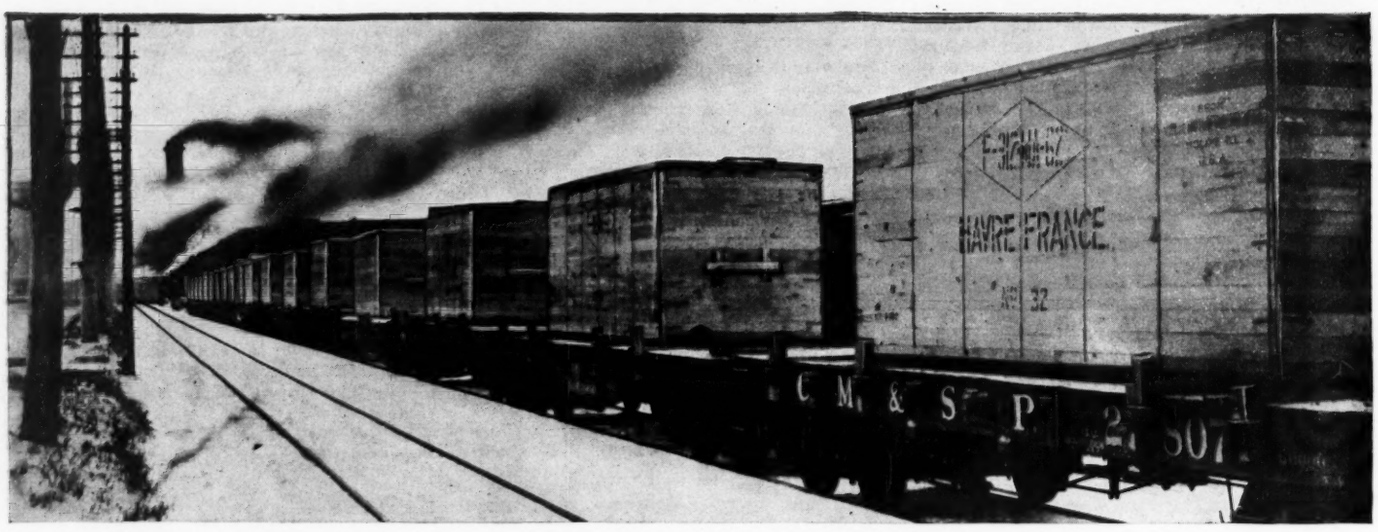
Club Champions Park Plan—The Automobile Club, of Seattle, Wash., now is inaugurating an active campaign to secure the interest and coöperation of affiliated clubs in the measure, which has been introduced into Congress by W. E. Humphrey, state representative, which provides that the timber along all permanent highways built through the forest reserves by the state, shall, upon application of the governor of the state, be turned over to the state for park purposes for all time.

Speare Dangerously Ill—Lewis R. Speare, former president of the A. A. A., and now president of the Massachusetts State A. A., and head of a big oil corporation at Boston, Mass., is dangerously ill at the Corey Hill hospital. He had been ailing some weeks and was taken to the hospital last week where an operation was performed to try to diagnose his case which is abdominal trouble. Because of his weakened condition the physicians feared he might not be able to withstand the shock.

New Club for Alliance—Steps have been taken for the organization of a motor club at Alliance, O. The movement is backed by a number of motorists in that section. C. H. Bleich, of the Alliance Chamber of Commerce, is one of the leaders in the movement. Gilbert Canterbury, secretary of the Canton Automobile Club, has been requested to aid in the organization. A movement also is on foot for the organization of a club at Minerva, O. A. D. Linbach is backing the movement.

Bay State A. A. Elects—The annual meeting of the Bay State A. A. was held last week and officers elected. The membership has jumped from less than 100 to 525 in 1 year. It is planned now to run it up to more than 1,000 in the next 12 months. The officers elected are George W. McNear, President; John J. McNamara, first vice-president; Arthur P. Teele, second vice-president; James T. Sullivan, third vice-president; Fred K. Swett, treasurer; John L. Hamilton, secretary; Frederick T. Moore, Dr. Herbert D. Boyd, Walter R. Bliss, Walter Williams, W. E. Hartwell, Jr., Wallace Durrell, Russell T. Green, Dr. Arthur McIntosh and Edward C. Backer, board of governors. The club is in a flourishing condition.

Among the Makers and Dealers



DOMESTIC AND EXPORT SHIPMENTS GREATLY DIFFER—That the packing of motor cars and trucks for shipment abroad differs to a very large extent from the method of shipping the same commodities in this country is evidenced by the above illustration. In sending motor vehicles abroad, they are packed in cases, which have means of handling attached like the handles on a trunk. The above shows a trainload of vehicles ready to begin their journey across the Atlantic, as the shipment appeared at the plant of the Velie Motor Vehicle Co., Moline, Ill. To the lay mind this presents a very much different conception of shipping cars abroad that one usually would expect, although this is the method pursued by manufacturers generally.

2,100 Fords in 1 Day—The Ford Motor Co., Detroit, Mich., established a new one-day production record Jan. 28 when 2,100 cars were made.

Wilson Truck Capital Increased—The capital stock of the J. C. Wilson Co., Detroit, Mich., manufacturers of the Wilson truck and top, has been increased from $20,000 to $225,000.

New Concern in Missouri—The Aurora Improvement Co., Aurora, Mo., has raised $15,000 to promote a motor car plant there and is in the market for parts for assembling demonstrators and for material in large quantities. The company proposes to put out a five-passenger car with starter and electric lights to sell for $500.

January Overland Production Jumps—January production at the Willys-Overland Co., Toledo, O., was 12,393 cars, as compared with 4,613 in January, 1914. It is an increase of 7,760 cars, and represents a daily output of nearly 500 cars during 25 working days. The total production of Overland cars in 1915 was 94,437, or 45,969 more than in 1914 when the total production was 48,468.

Briscoe Adds Buildings—The Briscoe Motor Co., Jackson, Mich., has arranged for the construction of a one-story office building, 300 feet long. An addition is under way at the motor department, also a one-story stock room between the motor and assembling room. Other extensions will be made gradually and by the end of July it is expected that the working force will be at least 2,000 men.

Firestone Factory Expansion—The rim factory of the Firestone Company, Akron, O., now occupies more floor space than the whole company did in 1910, according to figures just given out on expansion of the business at the plant. The demand for rims for the coming season will be for nearly 1,000,000 and this means a large addition to the present rim plant, the company says. The tire plant has been increased to give a daily output of 12,500 tires a day this year, instead of 7,500, last year's output. The biggest business in the history of the company is anticipated in 1916.

Scharpe Joins Silver—S. T. Scharpe, who for a number of years has been motor car editor of the New York Sun, has resigned that position to become connected with the C. T. Silver Motor Co., New York Overland distributer. He will be connected with the wholesale department.

Kelsey Wheel Increases Capital—The Kelsey Wheel Co., Detroit, Mich., has increased its capital stock from $1,000,000 to $1,500,000. At present there is outstanding $600,000 common stock and $143,500 preferred stock. To the owners of the common stock a 50 per cent stock dividend will be given to be paid from the surplus.

New Truck Company in Bay City—A new motor truck manufacturing company will start in business at Bay City, Mich., to make a 2-ton truck designed by Howard P. Woodworth, formerly with the Republic Motor Truck Co., Alma, Mich. Ten business men, at a meeting held at the Board of Commerce, Bay City, agreed to finance the new enterprise.

Chevrolet Is Adding—Another large additional factory building is to be started at once by the Chevrolet Motor Car Co., Flint, Mich. It will be located near the present plant of the Mason Motor Co., and will be several hundred feet long and probably several stories high. The present output of Chevrolet cars in the five plants located in this country and Canada, is now said to be over 1,000 per week. This production is to be increased as quickly as possible to 2,000 a week.

Maxwell Plant at Windsor, Ont.—The Canadian plant of the Maxwell Motor Co. will probably be located at Windsor. At a session of the city council it was decided to donate to the Detroit manufacturer three lots in the factory section of the city for switching purposes. Furthermore, free water will be given for 10 years and no taxations will be imposed excepting those for school and improvement purposes. The plant is to have a daily output capacity of 30 cars or more.

Conn Joins Cassidy—C. F. Conn, well known throughout the automobile accessory trade in northern and central New York, on February 1 became associated with the Edward A. Cassidy Co., Inc., sales managers for the Long horn G.-P. muffler cut-out and Cassco engine-driven tire pump.

Hayes Wheel Production Figures—At the plant of the Hayes Wheel Co., Jackson, Mich., 1,723,490 wheels were made during 1915, as compared with 844,608 in 1914. The plant employed an average of 1,000 men during the year, but at times there were about 1,400 men on the pay-roll. In 1909 only 81,416 wheels were turned out at the plant; in 1910, 145,660; in 1911, 299,576; in 1912, 322,599; in 1913, 333,523. The company has two other plants, one in Albion, Mich., and one in Anderson, Ind.

K. C. Ford Increases Output—Additions to the local assembling plant of the Ford Motor Co., Kansas City, Mo., that have been under construction since last May, practically doubling the capacity, have been completed and the output has been increased to about 125 cars daily. A freight car shortage that has developed in this territory has prevented further expansion, but it is expected the output will be increased to 150 cars per day within a few months. Opening the additions brought with it the employment of about 100 new workmen.

Willis Moves Up—The Chalmers Motor Co., Detroit, Mich., has promoted Frank B. Willis to sales manager. Mr. Willis has been assistant sales manager of the company during the last 1½ years. He came here from the East, where he was district manager for the company. Previous to his connection with the Chalmers, Mr. Willis was with the Studebaker, E.-M.-F. and Packard companies and for a period of 7 years was associated with Carl G. Fisher in Indianapolis. T. H. Smith and W. J. Dumpelman have been named assistant

sales managers. Both were special representatives.

No Change in Hupp Price—The Hupp Motor Car Corporation, Detroit, Mich., states that the price of the series N Hupmobile will not be changed between now and June 30, 1916.

Gifford with Paige—R. F. Gifford, for the last 6 months secretary of the Foreign Trade Bureau of the Detroit Board of Commerce, Detroit, Mich., has resigned to join the Paige-Detroit Motor Car Co., where he will be actively engaged in building up the company's foreign business.

Whiteside to Handle Dort—A. H. Whiteside, formerly connected with the Stevens-Duryea Co., Chicopee Falls, Mass., has been appointed distributer for Dort cars in Central Kentucky and Southern Indiana. He has opened an office and salesroom at 912 South Third street, Louisville, Ky.

Change in Cleveland Cole—Sidney S. Mier and Edgar J. Arnstine have secured a controlling interest in the Cole-Cleveland Co., Cleveland, O., distributors for the Cole cars in sixteen counties in northern Ohio. Mr. Mier has been made president of the company and Mr. Arnstine, secretary and treasurer. J. M. Smith, former local manager of the company, will continue with it. There will be no change in the line or in the territory and the policy of the company will be continued as in the past.

75,000 Maxwells by July 31—Maxwell cars to the number of at least 75,000 will be made during the 1916 fiscal year, ending July 31, 1916, it is stated by officials of the Maxwell Motor Co., Detroit, Mich. Last year a production of 60,000 was scheduled, but at that time the large extensions to the plant had not been started. These are now completed and machinery is being installed. When the enlarged works are in full operation a production of even more than 100,000 cars a year will be possible.

R-C-H Service Station in Detroit—Owners of R-C-H cars will from now on be able to secure service and any kind of parts that may be needed from the new headquarters of the R-C-H Corporation, 33 Woodbridge street, Detroit, Mich., where Charles P. Sieder, who was president and general manager of the corporation, and Ted F. Drews, who was assistant manager and in charge of the service department, will take care of the requirement of R-C-H owners. The R-C-H is no longer manufactured and its plant on Lycaste street has been taken over by the Liberty Motor Car Co., a newcomer in the motor car field.

Guyman Joins Cleveland Packard—George A. Guyman, for some years special representative of the G. M. C. truck in Ohio, has become associated with the Packard-Cleveland Company, Cleveland, O.

Chalmers to Have Dallas Branch—The Chalmers Motor Car Co., Detroit, Mich., will establish a branch house in Dallas, Tex. The company also will open a warehouse in which will be kept the various parts to be sent to representatives in Texas.

Danaher to Go to St. Louis—George S. Danaher, sales manager of the Overland-Louisville Co., Louisville, Ky., has resigned to become manager of the Hudson Phillips Co., St. Louis, Mo., Hudson distributer in that territory. Mr. Danaher will take up his new duties February 15.

Saxon to Make 30,000 Cars—During the last half of 1915, the Saxon Motor Car Corp., Detroit, Mich., made and shipped 9,812 cars, as compared with 3,036 during the corresponding 6 months of 1914. Production from now on is based on an output during the fiscal year ending July 31, of at least 30,000 cars.

Chevrolet-General Motors Stock — The Chevrolet-General Motors Syndicate announces that the offer of exchange on the basis of five shares of Chevrolet for one share of General Motors common was closed on January 25. Offerings will be considered hereafter at not to exceed four shares of Chevrolet for one share of General Motors common.

Zeigler Begins Operating—The Zeigler Mfg. Co., Alexandria, Ind., is starting operations. It has secured the American Wheel Works plant at Alexandria, Ind., which is well equipped for the manufacture of steel stampings and machine products, suitable for the motor car trade. Sales offices have been opened in 910 Merchants Bank Bldg., Indianapolis, Ind.

Will Make Starter for Fords—The Wolverine Starter Co., Grand Rapids, Mich., has been incorporated, its capital stock being $10,000. The new concern has arranged with the Wolverine Brass Works to make at the latter's plant its new mechanical starter for Ford cars. This starter has been designed by J. Frank Carter, president of the company; H. C. Cornelius is vice-president; Frank A. Hesse, secretary-treasurer. The directors are these officers and William J. Clark and I. Goldfarb. Offices are at 433 Michigan Trust building.

Hoffman Leaves Sun—Roscoe C. Hoffman, engineer and designer for the Sun Motor Car Co., Elkhart, Ind., resigns to devote his time to developing a semi-Diesel type or tractor engine.

Wadhams Oil Declares Dividend—The Wadhams Oil Co., Milwaukee, Wis., declared a cash dividend of 10 per cent on the common stock at the annual meeting February 1. Officers were relected as follows: President, E. A. Wadhams; vice-president, F. J. Kipp; secretary, G. A. Streeter; treasurer, S. S. Cramer; assistant secretary, Louis McNally; assistant treasurer, H. J. Noyes.

Tobin Globe Tire President—Horace B. Tobin was elected president of the Globe Rubber Tire Mfg. Co., Trenton, N. J., at the annual meeting of the company at Wilmington, Del., February 1., succeeding W. H. Linburg. The other officers were re-elected as follows: Vice-presidents, J. S. Broughton, H. L. Joyce; treasurer, H. B. James; and secretary and assistant treasurer, J. P. Hall.

New York Garagemen Active—The United Garage Association of New York State has become active after lying dormant for some months. At a meeting of the directors in Albany last week, under the leadership of President Haradon, arrangements were made to pay all debts and some consideration was given to the formation of better garage laws. Plans are on foot for a new lien law, patterned after the New Jersey law, which provides that a garageman can seize a car for debt anywhere in the state without any legal formality.

Will Add Accessory Department—The John Pritzlaff Hardware Co., Milwaukee, Wis., one of the largest wholesale and jobbing houses in the central west, announces the addition of a motor car supply and accessory department, which will transact a jobbing business with especial reference to the needs of hardware dealers. The announcement was made during the annual convention of the Wisconsin Retail Hardware Dealers' Association in Milwaukee, February 1 to 4. The company is on the approved list of the National Association of Automobile Accessory Jobbers.

Baltimore, Md.—Rowan Electric Mfg. Co.; capital stock, $25,000; incorporators, John S. Rowan, B. H. Cram and A. B. McElderry.

Chicago—Halsted and Fifty-eight St. Garage; capital stock, $1,000; incorporators, H. W. Goldsmith, B. P. Ruekberg and E. W. Bock.

Chicago—National Co-operative Tire Co., to buy and sell motor car tires and accessories; capital stock, $10,000; incorporators, W. H. Messick, W. E. Powell and J. T. Messick.

Chicago—Vim Truck Sales Co.; capital stock, $15,000; incorporators, J. E. Ringer, W. E. Willhartz and H. J. Ferguson.

Chicago—Wales-Adamson Co.; capital stock, $2,500; incorporators, E. A. Wales, J. A. Adamson and D. S. Campbell.

Cleveland, O.—Cleveland Motor Plow Co.; capital stock, $600,000; incorporators, Arthur Welsh, J. J. Schwitz, H. H. Allyn, R. T. Sawyer and G. M. Cummings.

Cleveland, O.—Ohio Auto Livery Co.; capital stock, $10,000; incorporators, Reuben Shapiro, I. B. Shapiro, D. B. Stone, Joseph Muccio and S. H. Miller.

Cleveland, O.—Giant Starter, to deal in motor car parts; capital stock, $5,000; incorporators, J. M. Andrus, Louis Englander, M. Taraba, Carl Dautel and E. E. Finley.

Cleveland, O.—Associated Rubber Co.; capital stock, $150,000; incorporators, F. J. Donkles, C. H. Olds, A. D. Wismer, R. W. Jeremiah, L. J. Johnson.

Danville, Ill.—Auburn Auto Co.; capital stock, $10,000; incorporators, E. R. Barkman, J. M. Barkman and H. H. Gast.

Detroit, Mich.—Detroit Tire Carrier Co.; capital stock, $25,000; incorporators, Charles H. Fenn, Victor M. Chadfield, Edmund J. Copland.

Indianapolis, Ind.—Day & Night Rubber Co.; capital stock, $10,000; incorporators, E. W. Gatt, E. E. Lindley, W. A. Engelhull.

Indianapolis, Ind.—Convertible Auto Body Mfg. Co.; capital stock, $25,000; incorporators, B. S. Cartwright, W. O. Cornwell, John Cartwright and Anna M. Cornwell.

Indianapolis, Ind.—Premier Motor Corp.; capital stock, $2,500,000.

Kansas City, Mo.—MacDowell Motor Co.; capital stock, $3,000; incorporators, Frank J. Hall, W. P. MacDowell and E. L. Stancliff.

Kansas City, Mo.—MacDowell Sales Co.; capital stock, $2,000; incorporators, D. Quier, W. B. Frost and O. C. Lueker.

Los Angeles, Cal.—Al. G. Faulkner Co.; capital stock, $75,000; incorporators, Al. G. Faulkner, H. E. Reach, Helen O'Neil, A. M. Smith, R. A. Baker.

Los Angeles, Cal.—Sunset Gasoline Co.; capital stock, $50,000; incorporators, E. A. Sawyer, J. F. Verdemark, E. T. Buckley.

Lynchburg, O.—Nolder Auto Light Control Co.; capital stock, $10,000; incorporators, Frank M. Nolder, Frank Roosevald, H. N. Henderson, T. E. Moorehead and Ed. M. Wiggins.

Milwaukee, Wis.—Motor Car Sales Co.; capital stock, $5,000; incorporators, H. E. Tolle, A. Ehrhardt and B. Poss.

New York—Thomas Auto Truck Co., to manufacture, buy and sell motor cars of every kind, etc.; capital stock, $250,000; incorporators, A. Cutter, C. L. Connet, A. Brandt.

Newark, N. J.—Elen Auto Supply, to manufacture and deal in motor car supplies; capital stock, $125,000.

New York—Adirondak Motor Sales Co.; capital stock, $25,000; E. V. Bulow, G. N. Nay, H. E. Floyd.

Newton Falls, O.—Newton Falls Construction Co., to manufacture motor car jacks; capital stock, $10,000; incorporators, J. L. McMann, G. H. Dickson, L. H. Dickson, M. J. Dickson and C. L. McMann.

Oak Park, Ill.—Oak Park Bus Co., to manufacture and deal in motor car parts and accessories; capital stock, $2,000; incorporators, C. J. Bassler, R. F. Bippus and A. G. McIntyre.

Pittsburgh, Pa.—Bard Motor Car Co.; capital stock, $500,000; incorporators, Kate G. Small, W. E. Harris, W. A. McCoy.

Pittsburgh, Pa.—Bard Motor Car Co., to manufacture motor cars; capital stock, $500,000; incorporators, K. G. Small, W. E. Harris, W. A. McCoy.

Racine, Wis.—Globe Seat Cover Co., to manufacture, seats, cushions, etc.; capital stock, $25,000; incorporators, Bruce Nelson, B. E. Myrup and J. W. Heaphy.

Sandusky, O.—Continental Rubber Co.; capital stock, $5,000,000; incorporators, G. W. Doerzbach, J. J. Dauch, J. T. Sloat, Sidney Frohman, L. J. Weadock and C. E. Sprague.

Seattle, Wash.—Ferris Motor & Machine Co.; capital stock, $15,000; incorporators, J. B. Ferris, Kell Houston, W. E. Ferris.

Sheboygan, Wis.—Klumb Engine & Machine Co.; capital stock, $40,000; incorporators, Paul, Oscar and Elmer Klumb.

Toledo, O.—Northwestern Tire Co.; capital stock, $10,000; incorporators, Carl Lomster, C. E. Hankison, L. G. Hankison and O. L. Hankison.

Webster Groves, Mo.—Gibson Motor Car Co.; capital stock, $5,000; incorporators, John D. Gibsch, Jr., S. H. Wallace and Fred Johnson.

The Motor Car Repair Shop

Magneto Testing and Recharging

ALTHOUGH the car owner is prone to blame the carbureter if his engine misses fire at low speed, this is not necessarily always the cause. If he has magneto ignition the missing at low speed might be due to weakness of the magneto, resulting in too small a spark when the engine is running slowly. At low speeds the magneto is not operating very rapidly either and unless it is in good condition, there is every reason to believe that it is not producing a hot enough spark to ignite the gas.

There are several ways of determining whether or not the magneto is in good shape. However, common sense will be the best aid. We are all more or less familiar with the theory of how a spark is produced and know that every time the lines of force passing through the armature from one set of poles of the magnets to the other are cut by the armature as it revolves, a spark is produced, so in testing the strength of the magneto, turn its armature slowly by hand and feel the resistance when it reaches a certain point.

An Unfailing Sign

This is the position at which the lines of force are broken and the stronger the tendency of the armature to resist rotation at this point the better the condition of the magnets. Usually the magneto repairman can gauge the strength of the instrument by this method, and the relative condition of any magneto can be judged by comparing a magneto of known condition with the one whose strength is in doubt. Aside from this means, which, of course, entails the removal of the instrument from the engine, the condition of the magneto often can be determined by watching the size of the spark it produces at the several plugs, although this is not an absolute criterion, due to extraneous conditions.

Having positively determined that the cause of misfiring and jerky running of the engine is due to the magneto, then the thing to do is to remagnetize the magnets, or field pieces as they more properly should be called. Temporary remedying of the ignition troubles due to magneto weakness is possible usually by adjusting the spark plug electrodes a little closer together than they would be ordinarily, thus reducing the gap which the weak spark must jump. This will not help its weakness, but it will make it less apt to fail occasionally—and a weak spark is better than none at all. In doing this make sure that the distance apart of all plug points is the same, otherwise the spark is apt to jump the shorter distances and let the plugs whose points are farther apart alone entirely. In other words, make sure that each plug has an even show.

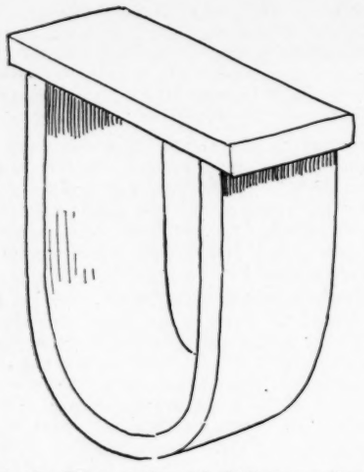


Fig. 1—Place a piece of steel across the ends of the magnets to retain whatever magnetism they possess when removed from the magneto

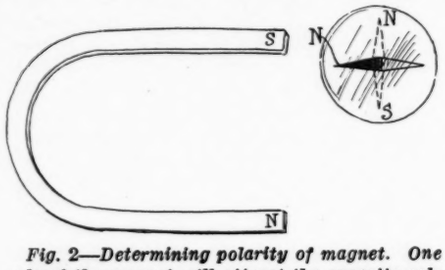


Fig. 2—Determining polarity of magnet. One pole of the magnet will attract the opposite pole of a compass

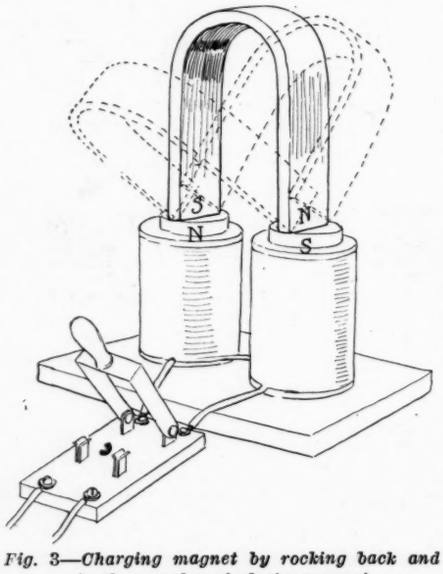


Fig. 3—Charging magnet by rocking back and forth on poles of electro-magnet

To remagnetize a weak magnet it is necessary to bring it into a strong magnetic field for a short time. The actual charging operation in itself is very simple indeed, but there are several very important things to remember when doing it.

The most usual way of remagnetizing the pole pieces, which are three in number in the average magneto, is to use a rather large electro-magnet. Nearly every shop where such work is done has some such apparatus, but in case you have not and want to make one, it is not such a difficult job. Let us pass that point for a moment, however, and assume that an electro-magnet of the four-pole type, with the coils about 4 to 5 inches in diameter and about 7 to 8 inches high, is available.

Place Steel Across Poles

Remove the magnets from the magneto and place a short piece of steel across the ends of each U-shaped piece, Fig. 1, so as to retain in it whatever magnetism it still possesses. Usually there is some designation to indicate which is the north and which the south pole, such as is indicated by the V painted on the south poles of a certain well-known magneto. But if there is nothing by which to determine the poles, take a small compass and hold one of the poles near it, as in Fig. 2. As the north pole of the magnet will attract the south pole of the compass, or vice versa, it is easy to tell which is which.

You are now ready to do the magnetizing. With a 110-volt direct current of about 5 amperes passing through the electro-magnet windings, the procedure is first to place the magnet on end on the poles of the coils, as shown in Fig. 3, being very careful to put the north pole of the magnet on the south pole of the electro-magnetic coil, and also remembering that the poles must not be altered in their relation to one another once the operation has begun. While this magnet is on the charging apparatus the current should be switched on and off rapidly at intervals.

Care must be taken not to over-saturate the magnets, for if they are overcharged they are useless. Ordinarily the time required fully to magnetize a U-shaped piece such as the average magneto possesses is about 1 minute. The best procedure is to leave the magnet in place on the coil for about half a minute and then take it off. When in good shape each magnet should be capable of lifting a piece of steel or iron weighing from 10 to 12 pounds, and if on testing it after charging, it fails to do this, it is not yet fully magnetized. On large magnetos, the lifting power of the magnets should be even more than this. If still weak, put the magnet back on the coils and rock it back and forth, being sure that the same poles are in contact as before, then turn it on its side for a few seconds, these various positions being indicated by the dotted lines in the sketch, Fig. 3.